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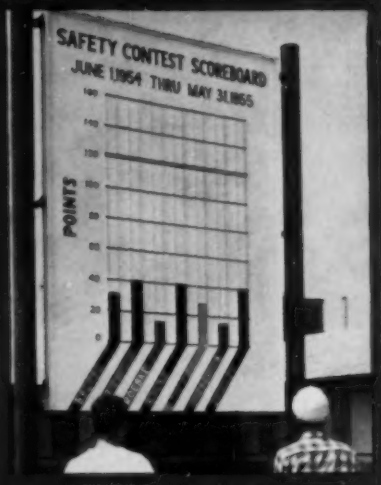
FEBRUARY 1955

McGRAW-HILL DIGEST

INTERNATIONAL BUSINESS AND INDUSTRY



INDUSTRIAL STANDARDS mean better products, smaller inventories, less paper work, higher profits.....p13

SAFETY PROGRAMS take many forms throughout industry. In one company, every man's duty is to promote safety. The results are startling.....p15

WOOD ARCHES create a clear span of 190 ft. Laminated timber permits large spans, provides greater strength. It's one way man improves on nature p23

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OBJECTIONABLE NOISES in your product cut its sales. The right program finds and cures these noises.....p32

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THIS IS A PICTURE OF SAFETY PROFIT AND ECONOMY

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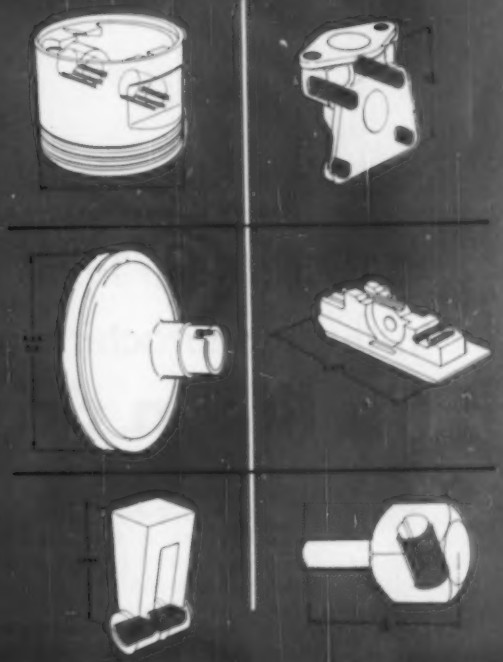

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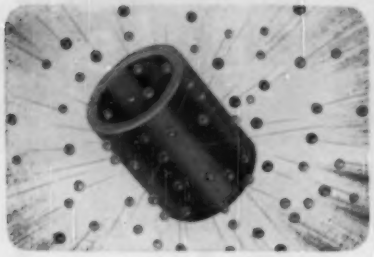

SHOT-PEENED ROLLERS have greater fatigue life, added ability to withstand impact.

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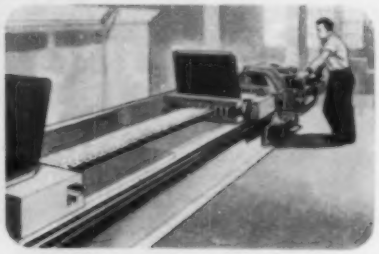
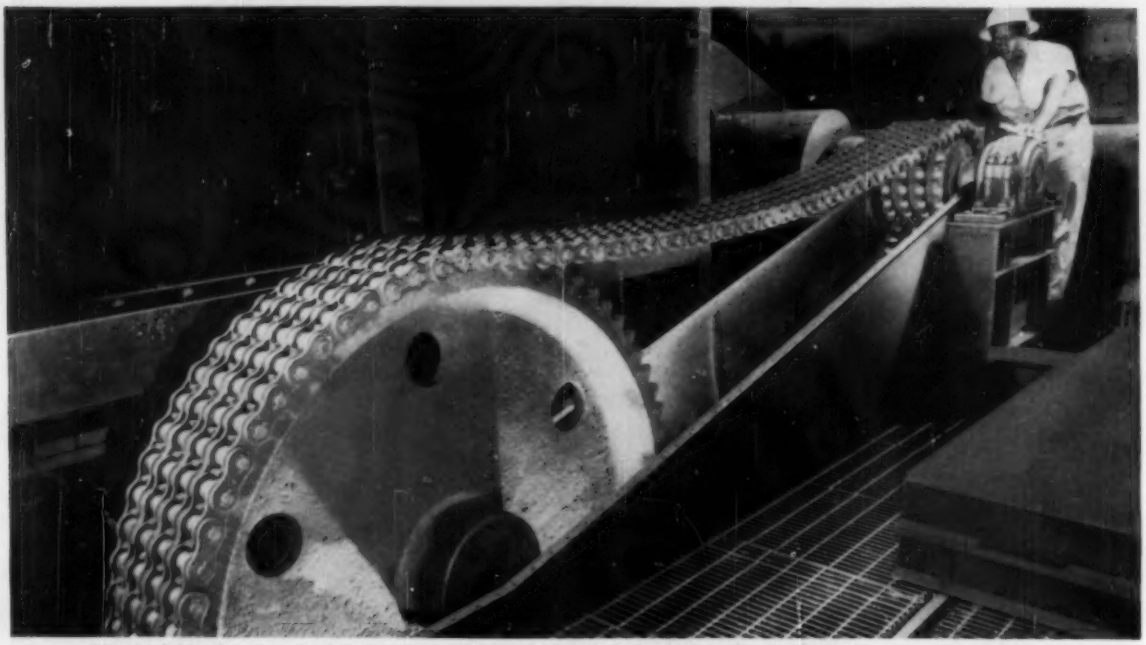


PRE-STRESSING of multiple-width chain provides uniform load distribution.



This Link-Belt Precision Steel Roller Chain drives a Link-Belt feeder built to handle 6000 long tons of ore per hour.

Link-Belt takes these extra steps in the manufacture of roller chain to give you

extra life in drives and conveyors

WHERE power must be transmitted unfailingly under demanding conditions of shock and impact, Link-Belt Precision Steel Roller Chain is the choice on an ever-increasing number of jobs like this huge iron ore feeder. Here is a driving and conveying medium that retains its better-than-98% efficiency throughout long years of service.

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Mc GRAW-HILL
DIGEST

. . . the best from 43 business magazines—see p52

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The charred remains of the First Security Bank of Utah in Provo, Utah, U.S.A., after a midnight fire gutted the building.

Bank burns-but not a day's business lost!

Fire broke out shortly after midnight at the Provo branch of the First Security Bank of Utah, and was soon raging out of control. By morning, the building was an empty shell, completely destroyed by flames—but the staff began serving its customers that very morning!

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"We could hardly have managed without your co-operation," says Mr. F. V. Nicholl (standing), Vice President and Manager of First Security's Provo branch to Mr. Lamont C. Hunt, the local Burroughs man who helped the bank resume service.

Call in your local Burroughs man

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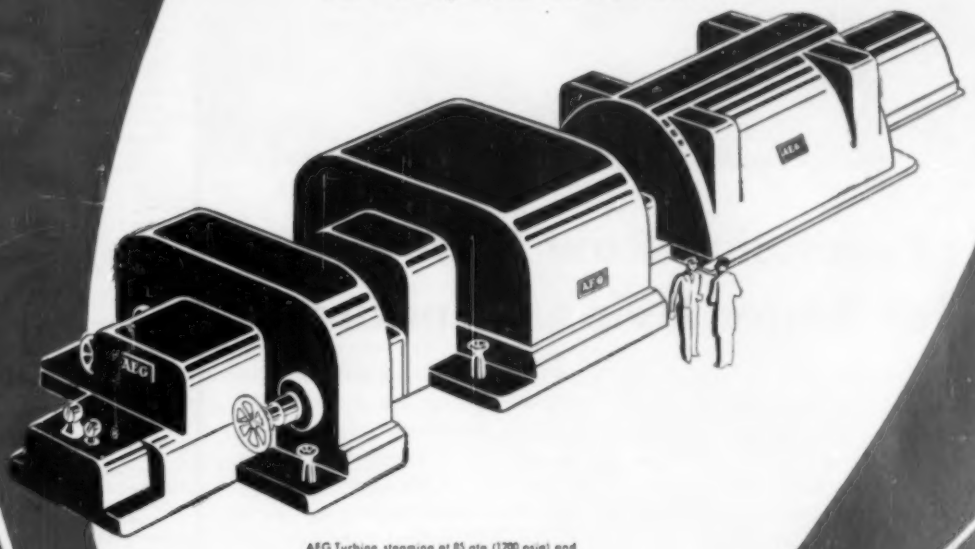

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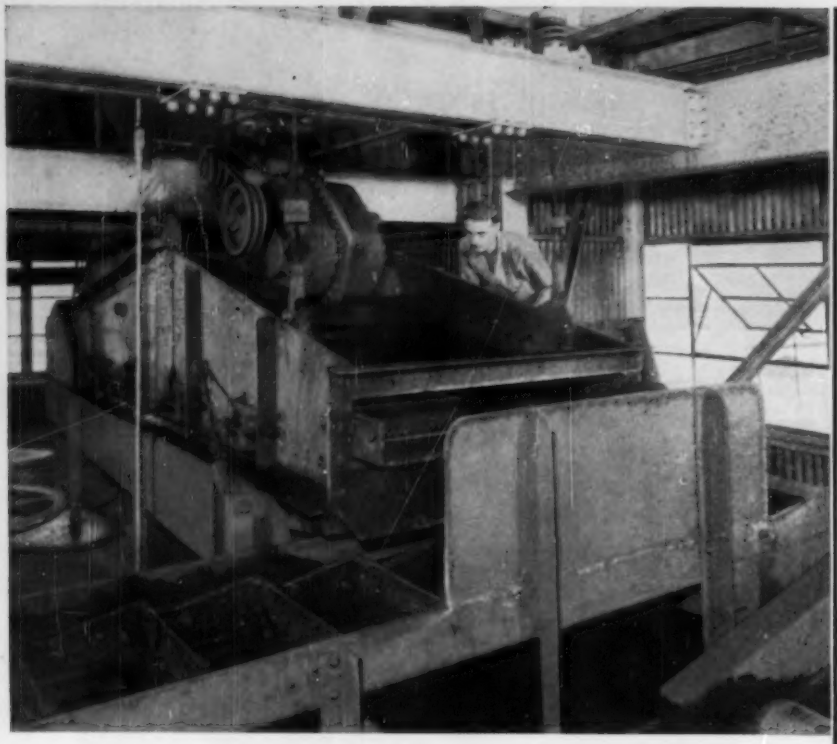

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BUSINESS TRENDS

BUSINESS ACTIVITY in individual U. S. industries can have an important effect on your own business during the remainder of the year. The reasons: taken in total, this activity adds up to the general level of trade (McG-H Digest, Jan, p4); secondly, industrial specialization has led to a high degree of industrial interdependence.

Suppose, for example, that you cut and sell lumber. Increased sales of electrical appliances will mean more packaging, hence more use of paperboard and a resulting higher demand for pulp. Checking the industry-by-industry expectations that follow may suggest new tie-ins that hadn't occurred to you before.

Steel ingot and casting output totalled 88-million tons in 1954, about 71% of the industry's capacity. You can expect this to go up to 78% for this year, or about 96-million tons.

Nonferrous metal production should be up. Last year, aluminum hit an all-time high; others were less sensational. This year, both output and consumption of all nonferrous metals should increase.

Chemical manufacturers expect the growth rate of the entire industry to become more apparent. A better year for chemical-consuming companies will contribute to an increased chemical output of at least 5%.

Machine-tool manufacturers will find less demand. Current best guess: shipments of about $650-million this year against $900-million last year. Government stockpiling will help, but may not be fully felt before next year.

Construction machinery will have a big year not only in the U. S. but elsewhere. U. S. heavy construction (with the exception of industrial building) will boom. Worldwide, the trend in the field (including industrial building) is strongly upward.

U. S. farm-machinery output has followed the trend of farm incomes . . . downward since 1952. While farm prices for produce are expected to drop again this year (about 2%), dealers' inventories are down somewhat. Machinery production may hold about level.

Office-equipment orders are running ahead of a year ago. Production will top '54. There is a field here for manufacturers abroad. Office-machinery prices include a large labor component. In many cases, this gives foreign firms an edge in spite of tariffs.

Electronic control equipment is at the beginning of a growth cycle. This year will see substantial gains.

Heavy electrical equipment sales may be down. Output is closely tied to capital spending by the utilities industries . . . estimated at somewhat lower for '55.

Electrical appliances face tough competition in the market. On the other hand, appliance sales are closely linked to rising consumer incomes.

Radio and television production will decline this year. Demand for home radio sets is down. Inventories of black-and-white television receivers are high, and consumers are holding off, pending further developments in color television.

Petroleum refineries will produce more this year following the increase in over-all industrial output and a parallel increase in truck transport.

Paper output will also follow the pattern of industrial production with a considerable pickup in paperboard as more shippers switch from wood boxes.

Rubber will have a good year. Replacement tires will be responsible, as more cars and trucks travel the roads. Also, chemical by-products will help.

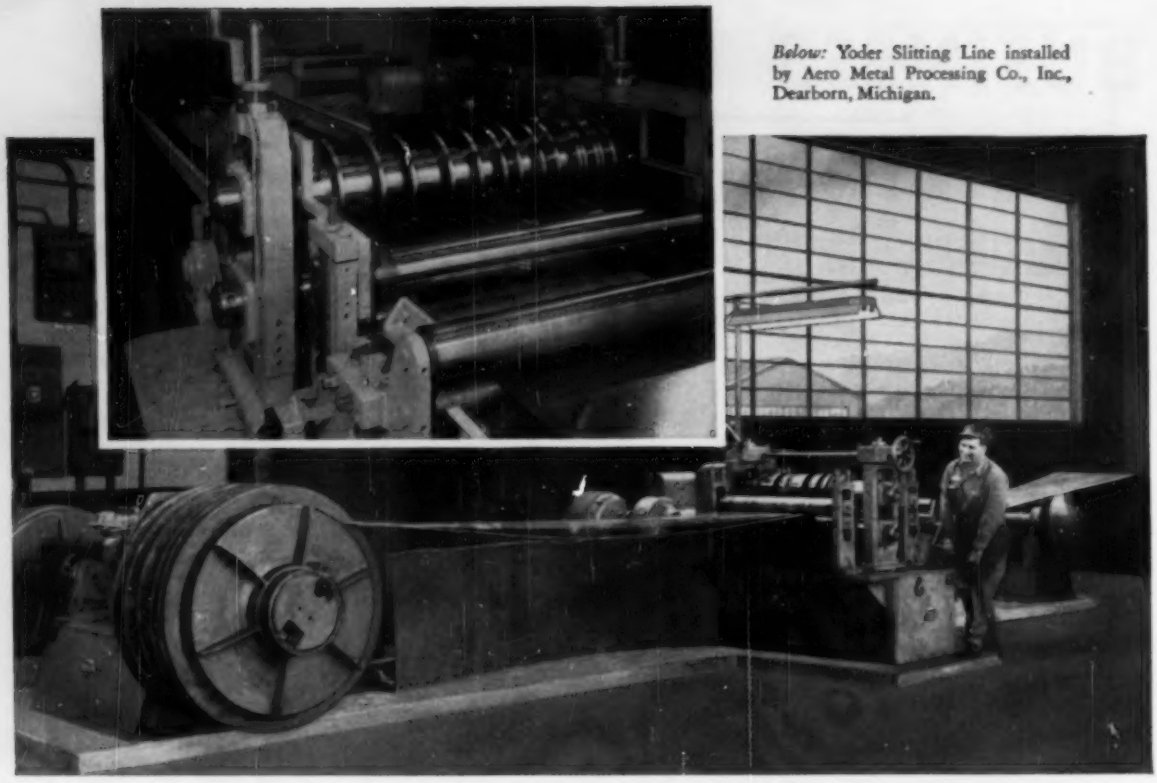
The lumber industry, hurt by strikes in '54, was down about 8% from '53. But increased construction has depleted inventories, and, barring more labor trouble, the industry should make a good showing.

Other construction materials—cement, glass, brick, and gypsum products—are headed for a big year, perhaps the biggest in their history. Behind the increase: commercial (not industrial) construction, a bigger highway program, and a growing maintenance market as home repairs increase.

The textile industry will have a good year, with most of the increase in synthetics and cotton. Woolen goods will probably continue to fall off.

Foods and beverages should pick up. The normal 2.5-million added to the U. S. population every year insures some growth. Packaging will be a big factor in consumer selection, with frozen foods edging up.

IF YOU EXPORT TO THE U. S., much of this will be good news. Prime-materials exporters will profit by the general increase in industrial production. And it is safe to predict that overseas manufacturers will find U. S. import regulations and tariffs more lenient by year's end.



Below: Yoder Slitting Line installed by Aero Metal Processing Co., Inc., Dearborn, Michigan.

When is a Slitting Line Profitable?

● Many variables are to be considered in determining where and when a slitting line becomes a good investment. Also of what size, type, speed it should be, and other special features required to make it most profitable under any given set of conditions. Without obligation, a Yoder representative will call upon request and discuss such details with you.

The Yoder Slitter Book deals extensively with basic considerations in the choice and operation of slitting lines; points out, for instance, how and where a relatively small, inexpensive installation may be more economical than a larger, faster, and costlier one. (Yoder makes all types). Time studies show how coil size, strip gauge, slitter speed, coil handling and banding time affect cycle time and cost per ton.

The book is useful not only to present operators of slitting lines but to producers, users and distributors of strip and sheet metal who may be considering installing slitting equipment. A copy is yours for the asking.

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Complete Production Lines

★ **COLD-ROLL-FORMING** and auxiliary machinery
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ENGINEERING YODER MANUFACTURING

INTERNATIONAL TRENDS

WASHINGTON—The bulk of President Eisenhower's foreign-trade liberalization program should pass Congress this session. It heads the Congressional agenda, and Eisenhower will throw his full political weight behind it. Democratic leaders of the new Congress are pledged to expedite the trade program in committees, which the Democrats will now control.

Cuts in imports of specific commodities are not likely. This will affect such items as oil, lead, and zinc. Such cuts might have been slipped into the trade agreements act. But even the most rabid protectionists do not want to legislate tariffs on individual commodities.

You can expect the trade liberalization program to follow last year's lines: 3-year extension of the reciprocal trade act with 15% extra tariff cutting authority; more customs simplification; ratification of the General Agreement on Tariffs and Trade (GATT), and a 14% differential (27% cut) in taxes on income from foreign investments.

Drastic reduction of the Buy American Act . . . from the original 25% price preference to the present 6% to 10% level . . . will make a big difference if you plan to bid on Federal tenders. In actual practice you will find that the 10% price preference will be the one more commonly encountered.

Don't be alarmed if there is a certain amount of Congressional reluctance on the ratification of GATT. The experts now expect it to pass. But the issue is not popular with the legislators. Acceptance of GATT represents a further delegation of Congressional authority to the executive branch of the government. That is why Congress has refused to pass on the issue thus far. But continued refusal will jeopardize the entire reciprocal trade program as the administration has taken the position that any further tariff cutting authority must be within the framework of GATT's multilateral tariff negotiating machinery.

ATHENS—Greece and West Germany have signed a new trade pact calling for the establishment of a combined commission to develop German investments and business interests in Greece.

The beginning of a new year invariably brings the inauguration and renewal of a number of such trade agreements between various countries.

It will pay you to watch this type of development closely. For one thing, you will get an idea of the probable pattern of international trade for the coming year. For another, such agreements provide an excellent guide to future competition. Here are several other recent international trade agreements that may directly or indirectly affect your business.

London—Britain and Iran have announced a commercial accord under which Iran can purchase against credit some £ 10-million of British goods over the next 5 years.

Helsinki—Finnish and Soviet officials have signed a trade pact to prolong their current agreement through 1960. Finnish exports to the Soviet will rise from their present $145-million level to $163.75-million in 1960. The Soviet will supply Finland with products valued at about $40-million less than the total of Finnish exports going to the Soviet.

Jerusalem—Israel and Denmark have renewed and slightly extended their present trade agreement. The pact contains no specific list of goods. Israel is permitted to buy any Danish product. Similarly, she can sell to Denmark any goods covered by the Danish list of free imports from European Payments Union (EPU) countries.

Caracas—Trade between Europe and Venezuela continues to grow. Latest sign is an agreement between the government-operated Venezuelan steamship line and Royal Netherlands Steamship Co. The two will operate a joint service between Hamburg, Bremen, Amsterdam-Rotterdam, Antwerp and Le Havre and Venezuelan ports.

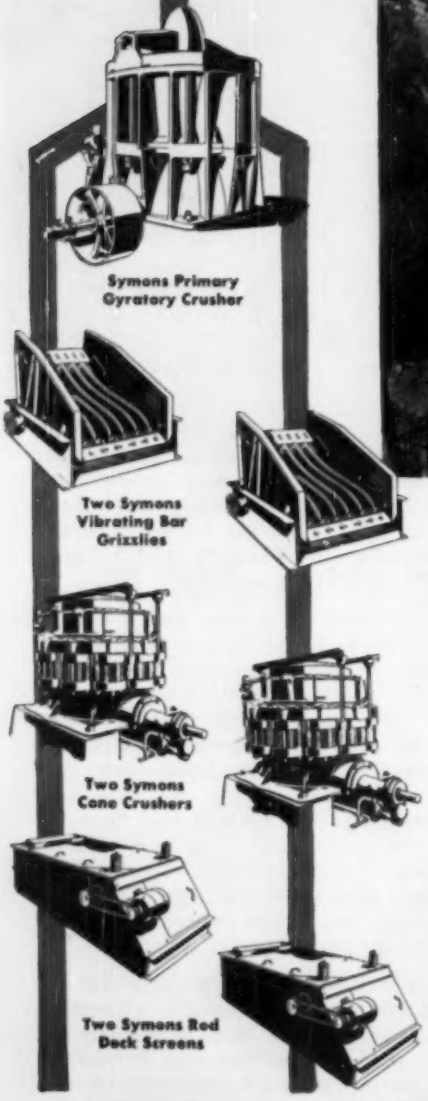
CAIRO—Egyptian authorities will help finance a wide range of development projects with three internal loans that will be floated following Cabinet approval. The loans will total $72-million (E £ 25-million) and will be backed by publicly subscribed bonds.

Major benefits will go to those projects that the government feels will eventually strengthen Egypt's economy and reduce dependence on foreign countries. Among them are: an iron and steel works, the Aswan dam hydroelectric scheme; enlargement of the government oil refinery at Suez to increase its output from 300,000 to 1,300,000 tons; the laying of a new oil pipeline between Suez and Cairo.

Egypt's Minister of Finance and Economy is counting on both internal and external sources of capital in financing the various projects. External funds will be necessary to finance imports of needed machinery and equipment.

Portugal's CABRIL DAM and POWER STATION

ANOTHER MAJOR PROJECT COMPLETED WITH NORDBERG MACHINERY


Symons Primary Gyratory Crusher
Two Symons Vibrating Bar Grizzlies
Two Symons Cone Crushers
Two Symons Rod Deck Screens

NORDBERG *Machinery and Experience again selected for another important project . . .* this time by HIDRO-ELECTRICA do ZEZERE, of Lisbon, for the construction of the new Cabril Dam and Power Station, in Portugal.

Major equipment supplied by Nordberg for this installation included an Apron Feeder; a Symons® Primary Gyratory Crusher; two Symons Cone Crushers; two Symons Vibrating Bar Grizzlies; and two Symons Vibrating Rod Deck Screens.

The outstanding success of this modern Nordberg equipment has been amply proved by the many statements of complete satisfaction written by the engineers and supervisory personnel connected with the Cabril Dam project.

Here, then, is further evidence that for large or small operations—including mineral reduction, base or precious metals, public works projects, or commercial aggregate production—you can depend on Nordberg Machinery to deliver maximum output at lowest possible cost.

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the shortest standard truck on the market today!

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Maximum Maneuverability—Only 26" longer than the load, the shortest standard truck on the market.

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Great Efficiency—Double reduction of spur gears gives maximum ton-miles at least power cost.

Balanced Load Distribution—Double lift cylinders for smooth lifting and lowering.

Safety—Deadman switch cuts power when brake is applied, handle automatically returns to brake-position.

Easy to Service—All operating units accessible without lifting or dismantling. Drive wheel tire is quickly demountable.

The versatile POWRWORKER will give you big-truck benefits at amazingly low cost. In dozens of ways, it will speed up your handling operations, increase your operating efficiency. Your experienced Clark distributor will give you full details on the new Powrworker and how it can be applied to your handling problems.

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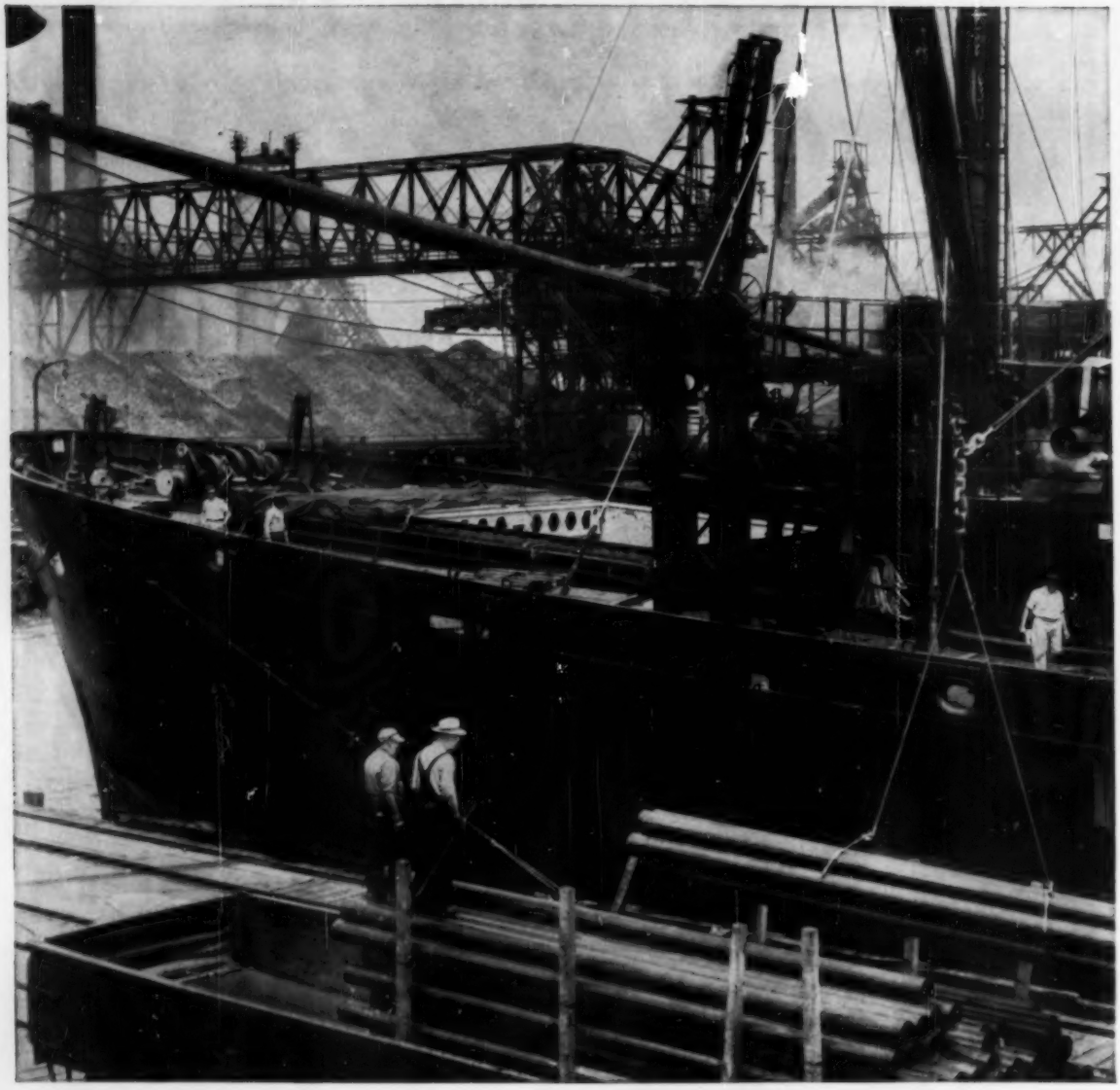

From the Steel Mill right into the Ship

Bethlehem's great Sparrows Point plant in the Port of Baltimore, U.S.A., is the world's largest steel mill located on tidewater. Products for export can be loaded at this plant directly aboard ship—an arrangement with twin benefits to the purchaser.

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Second, it minimizes the possibility of damage by greatly reducing the handling required.

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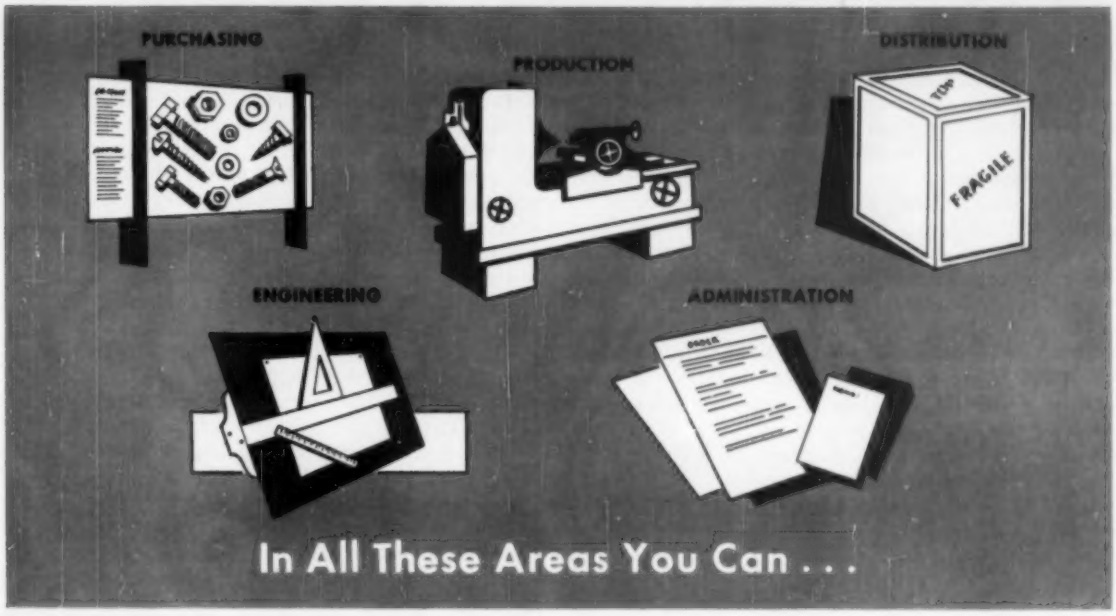


Save with Standardization

"For every dollar spent to develop standards, we have saved over $6 net."—E. I. du Pont de Nemours & Co.—An original Digest article

ON SUNDAY MORNING, February 7, 1904, a fire broke out in Baltimore, Maryland. When it got beyond the control of the local fire department, help was summoned from Washington, New York, and Philadelphia. Special trains rushed apparatus over cleared tracks from the three cities. Then the equipment stood idly by while 150 acres of Baltimore's business district burned to the ground. Their hose couplings would not fit Baltimore hydrants.

As late as the mid-1940's a machine-tool manufacturer reported the following case: "A $25,000 machine tool waited 4 weeks for a can of paint so that it would match other tools in the factory of its purchaser. The interest charge alone amounted to $125." And yet, earlier acceptance of a standard color for all machine tools (American Standard Z55.1—1950) would have prevented this.

In discussing standards, it is first necessary to understand that there are several different kinds of standards. There are, for example, company standards, industry standards or association standards. Company standards are those adopted by a single organization for its own use. (An electrical control manufacturer reduced its inventory of brass items to ¼ the original number). They may regulate types of materials used in certain operations, or perhaps even operating procedures.

Industry standards are those that have been adopted by organizations engaged in the same type of operation. They may be materials standards, safety standards, or standards regulating certain parts, components or tools. Adoption of industry standards leads to considerable economies.

In putting industry standards into effect, interested industries often work through trade associations, or, as is the case in an increasing number of countries, a standards association which operates at a national level and devotes itself entirely to helping various industries to standardize where it is desirable to do so.

But in this connection, it is important to note that standards, to be most effective, must be voluntary. Whether within a given company or on an industry-wide basis, the absolute cooperation of all concerned is necessary if such a program is to be successful.

Standardization is a two-way street. It must be accepted by both manufacturer and purchaser. Today that acceptance is growing. The reason: convenience and savings to both supplier and buyer are too great to ignore.

Standards play a part in every step of modern industry; and the greater the extent to which standardization can be integrated into the various phases of a given operation, the greater are the benefits that can be derived.

Starting with the basic function of procurement, here are some of

the savings which can be realized through standardization:

- Purchase of larger quantities permits more economical buying.
- Purchase of larger quantities of fewer items permits buying under favorable market conditions.
- Adherence to quality standards in raw materials and components lowers the number of rejects found in final assemblies.
- Acceptance of a standard unit by a number of purchasers permits suppliers to offer the unit at a lower cost.

A small petroleum company in the U.S. points to a striking example of the latter point. ". . . recently the West Coast petroleum industry cooperated on a small item and slashed its cost nearly in half. Everyone, it seems, who had a gasoline delivery truck also had his own idea of a delivery funnel. We had our own specifications, which cost us $20 per unit. The new standardized specifications, agreed to by the industry and the manufacturers, permit funnels to be bought on an 'off-the-shelf' basis at a saving of $9 per unit."

In another company: "Fifty-seven types of angle cutters for machining dies have been reduced to 28. The larger quantity of each type purchased, plus group buying for all plants, has resulted in a saving of approximately $10,000 a year on those tools alone."

Where Economies Lie

Considerable economies can result from an appreciation of standardization on the part of engineering and product-development groups within a company. Among these are:

- Variety reduction and greater interchangeability of parts, components, and sub-assemblies.
- New designs are more readily coordinated with existing products.
- In the department itself, standardized drawings and drafting room practices save time and lessen chance of error.

By substituting industry and national standards for special designs, manufacturers in the U.S. who had been paying from $49.90 to $70 per hundred for 1 in. by 4 in. hexagonal-head cap screws found that the same screw could be bought for $9 per hundred. This was a case of suppliers of screws being able to reduce price through greater quantitative demand. But the demand for the screws started with the careful orientation of the engineering departments of a number of manufacturers.

In another case, a steel substation structure consisted of 154 different kinds of pieces made of numerous angles, channels, and plates. A redesign resulted in a stronger and more flexible substation, which consisted of only nine different pieces made of two sizes of angles, two sizes of channels and one gusset plate.

The best price previously obtained on the old design was about 18¢ per pound galvanized. The cost of the material for the new design was less than one-quarter of the cost of the old, and over 50% was saved on the price of erection. Additionally, a large number of drawings was reduced to a single sheet containing both shop details and erection plans.

Although the basis lies in good engineering, it is in the manufacturing phase of industry that some of the most spectacular savings are made through standardization. The opportunities are these:

- Savings through fewer materials and a smaller variety of parts.
- Longer production runs and greater continuity of operation.
- Greater uniformity of operations, permitting simpler training of labor.
- Easier inspection.
- Improved quality control.
- Maximum mechanization.
- Economies of special purpose machines.
- Quick interchangeability of machine parts in the event of breakdown.

To highlight just a few of these advantages, a large automobile manufacturer reports that changing from a company-standard drill 2½ in. long to a standard drill of 1⅞ in. with a longer holder, resulted in a longer tool life and a saving of $3,500 per year.

A similar case is that of the aircraft manufacturer who saved $268 per plane by substituting industry standards for bolts in the place of company standards.

In 1952, the meter and instrument department of General Electric Co. revealed that it had standardized the aircraft instrument generator it was supplying to military aircraft, reducing the number of models from 102 to 2 without impairing the quality of the product. The price dropped from $28 to $22 per instrument. An aircraft speed indicator used on jet planes was produced in 260 different models; it is now available in 11 models.

Lower Costs, Better Service

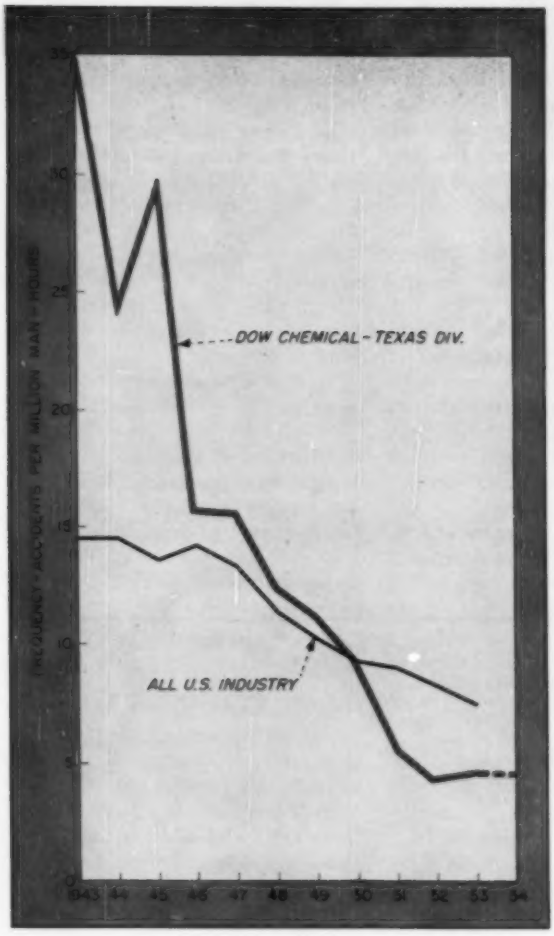
Even in the distribution of products, standardization can do much to reduce costs and speed service. To illustrate this, one automobile manufacturer recently found that by standardizing 60 shipping cartons for service parts, to take the place of 145 cartons previously used. Yearly saving was $15,000.

Finally, there are a number of general benefits that are well worth full consideration. Among them:

- Reduction of inventories of materials, parts, and end products.
- Minimum storage costs.
- Simplification of office work.
- Improved inter-departmental coordination.

American Standards Association is the recognized U.S. channel for participation in international standardization matters. It makes available to U.S. industry information on foreign standardization work, and, in the interest of U.S. foreign trade, it seeks to promote abroad a knowledge of U.S. standards.

Thirty-four countries having national standardization bodies belong to the International Organization of Standardization. Seventy-seven technical committees of the organization are now at work on international standardization projects.



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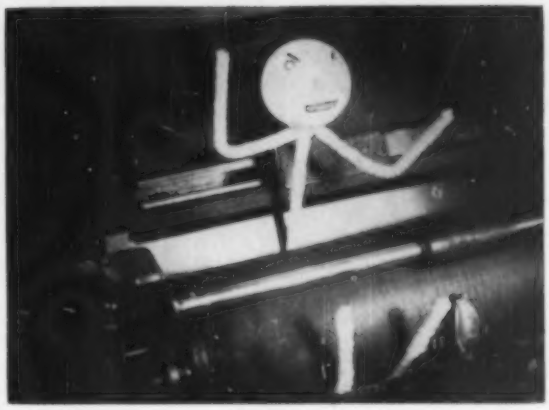

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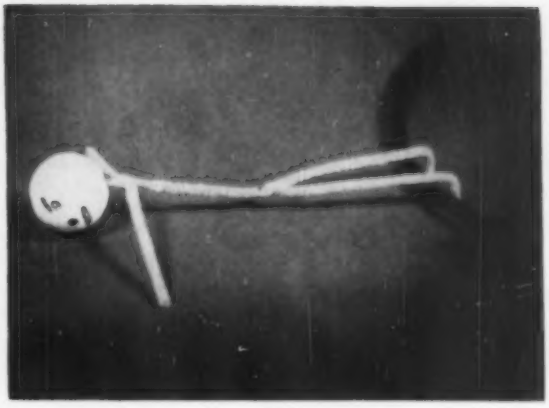


Every Man Is a Safety Man

This safety program faced a tough job—an accident-frequency curve at the astronomical height of 34.9 accidents per million man-hours

SUCCESS of Dow Chemical Co.'s Texas Division to reduce the number and frequency of its industrial accidents stems mainly from its success in making every man a safety man. Everybody gets into the act—from top management to the lowest echelon.

To everyone, the idea is emphasized that safety cannot be segregated from other operations. There are no "sermons," no unwieldy general safety meetings, (where no one pays attention), and no complicated paperwork where hazardous jobs must be done.

The safety program differs from most programs in two respects:

1. The safety department issues no safety rules or regulations. It has no power to enforce safety rules, rarely sponsors safety meetings, cannot issue safe work permits, and has no direct responsibility for preventing injuries. (Only top management issues rules; all other duties are the responsibility of the departmental supervisor.) The safety department is strictly a staff organization, except that it does supply safety equipment.

2. **Individual supervisors** prepare their own safety programs, tailored to fit special needs and reflecting the men's own ideas on the subject. They have wide latitude to use their own initiative in planning their programs, although they usually call on the safety department for help in preparing the programs and providing literature and visual aids when needed.

Six safety supervisors, assigned to specific areas, are available for this purpose. They also keep safety and accident records and make all flammable gas tests. A major responsibility of each safety supervisor is "selling safety" to the departmental supervisors in his area. While he never makes formal safety

inspections, he reports trouble spots to departmental supervisors.

Accident investigation is another of his important responsibilities. He may even ride the ambulance. His report of the accident is made to the affected supervisor and forms part of that supervisor's own investigation.

The safety department is responsible for safety promotion. Both unusual and conventional aids have helped. Little doll-like figures, for example, were made up from pipe cleaners and photographed for use on plant posters. They feature various ways that accidents happen — falls, poor housekeeping, carelessness, and others.

Another promotion trick is the mock ambulance call. Complete with sirens screaming and a first-aid crew, it announces the winning of a safety award in a spectacular fashion.

Conventional means are used, too. They include poster scoreboards on safety contests, special "consecutive-safe-days-worked" calendars, company-sponsored social gatherings for teams winning safety contests, news bulletins, safety letters, group meetings, safety inspections, and protective-equipment demonstrations.

Mainspring of the safety program is the executive safety council, made up of 30 top executives headed by the division general manager. The group meets monthly, with the first order of business the review of detailed reports of a three-man accident review committee.

Always on the agenda are the status of the over-all safety program and consideration of any recommendations. This group issues all general safety rules and makes specific recommendations for division-wide problems.

An example is the standardization of eye-wash baths in appropriate areas and an order that washing must be continued for at least 15 min. following an eye injury caused by a chemical. Experience from past accidents proved that lost-time injuries from getting chemicals in the eyes could be almost completely eliminated by immediately flushing the eye with water and continuing for 15 min.

Six Years—No Lost Time

In October, U. S. Gypsum Co.'s Oakmont, Pa., plant reached 6 years and 2-million man-hours without a lost-time accident. Chiefly responsible are its communications methods to make workers think of safety:

1. Each supervisor must interview four or five employees weekly on safety and make a written report.

2. Supervisors hold frequent 30-min. departmental safety group meetings. Comment from workers is encouraged.

3. Hazard report forms permit every employee to make suggestions on hazard elimination.

4. Message repeater, activated by worker stepping on a rubber mat beneath the time clock, gives a 30-sec. tape-recorded safety measure once or twice a week.

5. Plenty of posters, sometimes humorous, attract reading.

6. Works manager meets with departmental superintendents once a month. A specific safety matter is always discussed.

7. Safety signs and slogans are lettered on stairways, walls, trucks, carts.

8. All supervisors attend monthly safety meetings.

9. All new employees are indoctrinated in accident prevention by both personnel manager and works manager. Specific job hazards and precautions are brought to his attention.—Paper Ind, Nov, p800

In addition to the executive safety council, area accident review committees meet monthly. They have rotating memberships of supervisors, discuss and evaluate all accidents in their specific areas, make general safety inspections. Chairmen of the area committees meet with an accident review committee, a three-man group from the executive council.

Key men in the safety program are the departmental supervisors. Duties include:

- Enforcing safety rules.
- Making safety inspections.
- Taking action against hazards.
- Issuing safe work permits.
- Selling safety to their men.

An inspection group is required in each department. Headed by the supervisor, it usually has a rotating membership. It inspects the area once a month and reports findings and suggestions, which are then posted on the area's bulletin board.

Combining safety with operations is well illustrated in issuance of safe work permits. It is recognized that the superior is best fitted to decide whether it is safe to authorize work. An added precaution is approval of every permit by the superior of the work detail. Thus, two superiors have thought the job over carefully from different viewpoints and experience.

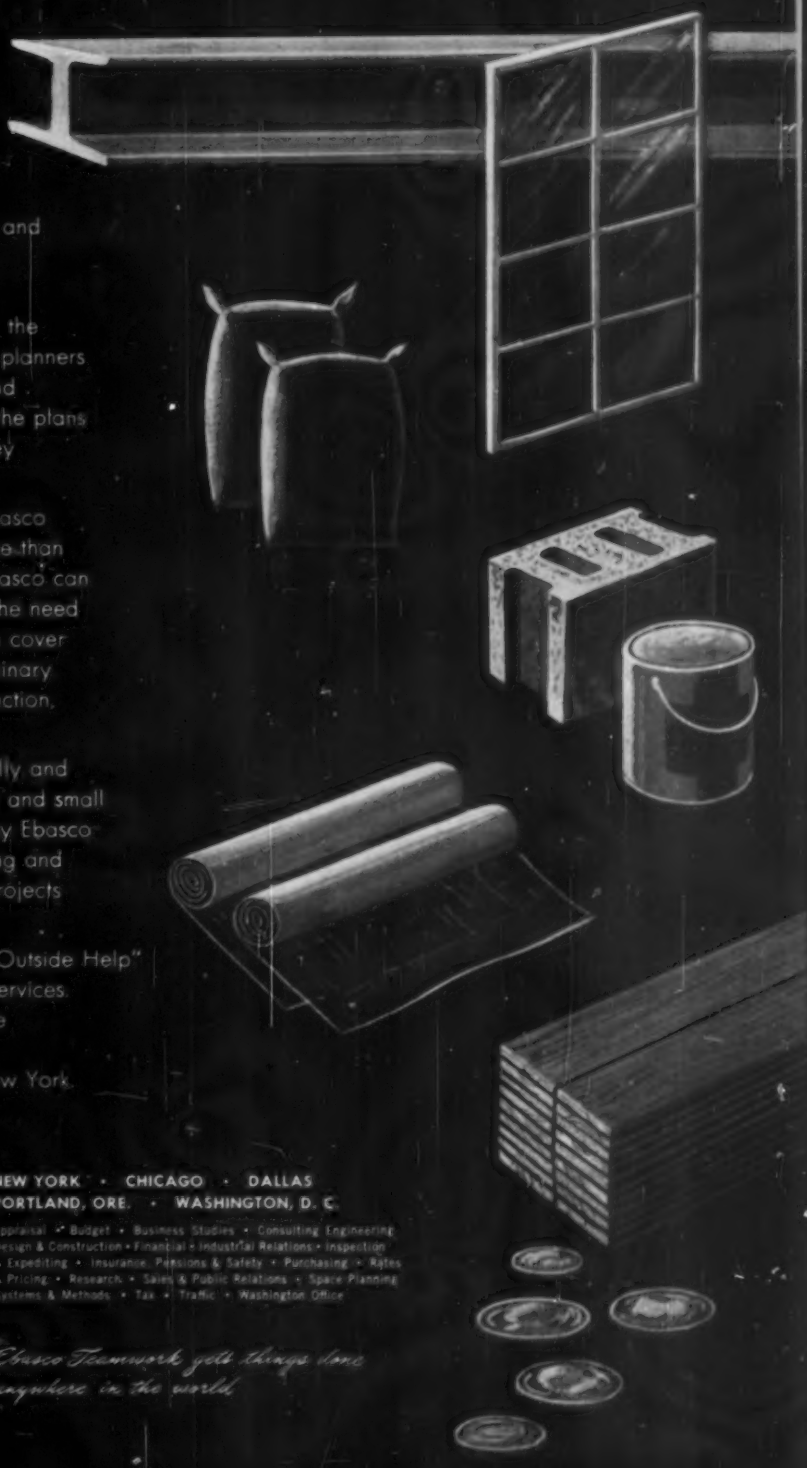
Selling safety to the workers is an urgent responsibility. It is here that safety is emphasized as being one with other operations. The attitude of the men—the way they use their tools and develop their own ideas—decides whether the program fails or succeeds.

How the supervisors do this important job differs. One holds few meetings but makes sure that he talks about safety to each man every month—about the job's hazards, protective clothing, teams' standing in the latest safety contest.

Another supervisor makes use of a modified spelling bee to familiarize his men with general safety rules. Still others use a multiple-choice quiz for the same purpose. These are written tests, with questions that make the man think.

Has the whole program succeeded? A look at the accident-frequency chart answers that question, especially when it is realized that personnel was recruited, when the plant was opened in the early 40's, from an area devoted to farming and fishing. Workers were new to industry, and the plant processes themselves were new. Licking this combination makes the record even more impressive.—Pet Proc, Dec, p1894 & 1898

what are new plants made of?



Into a new plant go steel and glass and concrete—machines and metals, manpower and money.

More important, however, is the skill, the experience and the resources of the planners and constructors. The engineering and construction firm that stands behind the plans of a new plant may well hold the key to its future success.

Over its half-century of existence Ebasco has engineered and constructed more than two billion dollars of new plants. Ebasco can be brought into action the moment the need for new facilities is recognized—can cover every step from site selection, preliminary planning, engineering, actual construction, right through initial plant operation.

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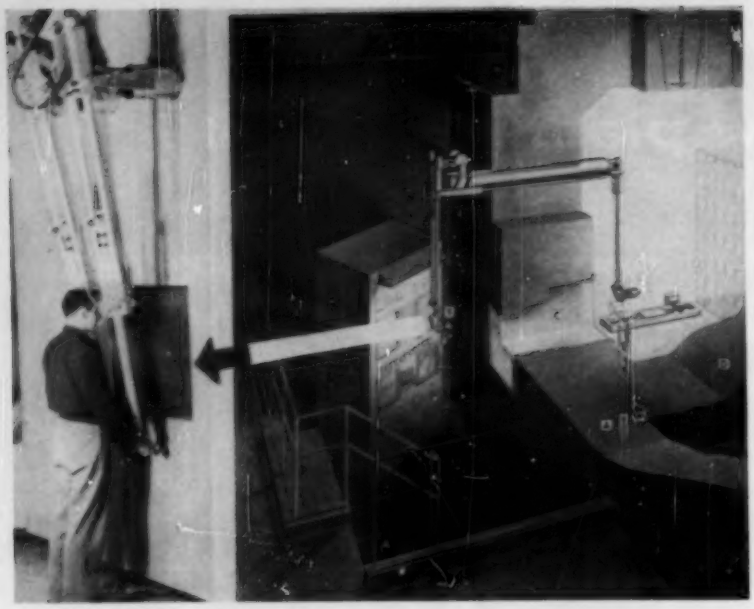

Robot Toiler for Radioactive "Cave"

First "master-slave manipulators" for private industry will be installed in Standard Oil Development Co.'s new radiation laboratory. Researchers outside the 6 x 9 ft. concrete cell will be able to work steel "hands" inside to handle the radioactive source, a length of cobalt pipe. When not in use, the pipe will be stored in a well in the floor. Concrete walls, 4 ft. thick, give the room its cave-like look.—Chem Wk, Dec 11, p76

Faster Wire Drawing On Automatic Machine

Automatic drawing of wire in one continuous operation permits production at 3,500 to 5,000 ft. per min. at less cost. In a process used by Plastic Wire & Cable Corp. (Jewett City, Conn.) a ⅜-in.-dia. soft copper rod enters a breakdown machine and goes through 13 successive drawing dies for a 20% reduction per die.

Arrangement of dies in banks greatly reduces time required for drawing operations. An annealer and take-up machine constitute the automatic process equipment, which continuously anneals and spools the finished wire.

The annealer, located between the drawing elements and the take-up, consists of four power-driven contact sheaves over which wire passes. These are energized by a variable-voltage, low-potential transformer located behind the annealer. Final contact sheave is located in a quench tank at the lower end of the annealing zone.

Take-up unit consists of two single spool units controlled by magnetically operated brakes for stopping full spools. Air ejectors remove full reels from arbor to the reel elevator.—Elec World, Oct 18, p164

Paper Forms for Piles

Faced with 10 to 15 ft. of fill over a good rock stratum and a water table 4 ft. below grade, Springs Cotton Mills (Lancaster, S. C.) had a tough foundation problem. Conventional piles would not work—not enough skin friction. Open-ended pipe pile cost too much.

The solution was to use a hole-boring machine with a 20-in.-dia. auger to excavate to rock, then quickly drop a 16-in.-dia. heavy-paper form into the hole before mud seeped into it. Water was pumped out of the tube, a prefabricated reinforcing cage dropped in, and dry, well-vibrated concrete immediately poured.—Eng News-Rec, Dec 9, p48

Loudspeaking Telephones Communicate in Mine

Needing a modern communications system for its coal mine, Cannelton Coal & Coke Co. tried loudspeaking telephones with auxiliary battery power tied in with the trolley system.

The loudspeaking telephone is wired to a telephone pair exactly the same as any telephone. The trolley circuit serves two vacuum tube amplifiers. Each telephone has a standard handset with a "press-to-talk" button. Sound volume is easily adjustable.

To communicate, you simply pick up the handset, press the button and talk. Voice output, greatly amplified, goes out over the telephone pair. All other loudspeaking telephones on the line pick up the signal and send it out over a bell-type loudspeaker.

Power failure automatically switches the handset to battery power. The unit then serves as a standard telephone. A coupling unit allows all fixed stations to talk to the locomotives.—Coal Age, Dec, p66

Fork Truck, Fiber Pallets Save Space and Handling

About 100 yd. separates the railroad siding from the unloading dock at the Narragansett Brewing Co. plant. (Cranston, R. I.). That presented a tough materials-handling problem. Here's how they solved it.

Suppliers ship their material (bottles, cans, cartons) on 4x4-ft. fiberboard pallets in 40-ft. double-door boxcars. Three 4,000-lb. fork lift trucks were equipped with Clark Equipment Co.'s Pul-Pac attachment. It grasps an edge of the fiberboard pallet, pulls it onto the forks. To unload, the attachment pushes the load off the forks.

One fork truck unloads a car and loads a trailer. The truck can load a trailer from one side, pushing a load to the far side of the trailer bed. Another fork truck unloads trailers in the warehouse, stacks loads four high.—Factory, Nov, p94

Noise Control Provides Better Office Efficiency

Studies of worker efficiency show strong relationship between noise in offices and such important factors as turnover, production, accuracy, health, and better working conditions.

At Aetna Insurance Co. (Hartford, Conn.) before-and-after studies showed that noise reduction raised general efficiency 9.2%, decreased typing errors 29%, decreased machine-operators' errors 52%, and cut employee turnover 47%.

Noise is any sound that is unpleasant to the listener or disturbs the worker. It includes sudden sounds that rise above the normal office hum. Three simple steps can start you reducing noise:

- Find out from where the various sounds are coming.
- List sound sources and get employee cooperation in eliminating them.
- When you have cut the sound level as much as you can, call in an engineer who knows his acoustics. His recommendations should cut your office noise to its final level. The most you can expect is a reduction of 10 decibels or an apparent reduction in total sound of 50%.—Am Business, Nov, p18

Tramway Piles Ore

Stockpiling of iron ore at the Peterson mine on Northern Michigan's Gogebic Range will be handled by aerial tramway. Ore from the shaft will go to stockpile in two tramcars, each holding 170 cu. ft. of ore. Each car rides on four 2-in. track cables, at 1,500 ft. per min.

Haul rope is a 1¼-in. conventional hoist rope. Drive wheel is 12-ft. in dia. and is rubber-lined. A 300-hp. motor drives it. Special devices protect the tram from overspeed and over-travel.

The tramway will be a single-span unit. Distance from the loading terminal to the tail towers is 1,500 ft. Ore stockpile will be 70 ft. high and will provide storage for 1-million long tons of ore. Yara Engineering Co. (Elizabeth, N. J.) designed and built the tramway.—Eng & Min J, Dec, p94

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Electronics Now Control Chemical Processes

Electronic control is now making marked gains in chemical-processing, petrochemical, and petroleum industries. Operating experience with one of the first complete process units to be electronically controlled—Rock Island Refining Corp.'s Platformer at Indianapolis, Ind.—is convincing.

Advantages of electronic control include:

1. Reliability in cold weather.
2. No air tubing racks needed.
3. Increased flexibility.
4. Closer control.
5. Less sensitivity to outside interference.

Among the new control ideas is data reduction, or automatic logging. It can absorb and correlate the tremendous amount of complex process information necessary in routine plant operations. Two companies, Fischer & Porter Co. and Beckman Instruments, Inc., now offer data loggers. Esso Standard Oil already has two installed in refineries.

Biggest advantage is the elimination of manual logging and freeing the operator for more processing supervision. Between loggings, the instrument can be applied to scanning inputs, reporting only selected or abnormal values.—Pet Proc, Nov, p1728

Assures Fuel-Oil Supply

Standby fuel-oil supply is assured by a West Coast municipal plant. A DeLaval-Imo dual-drive pump is mounted on one bedplate with a 50-hp. single-speed electric motor and a steam turbine. One unit takes over if the other prime mover fails.

The motor, on a common shaft with the pump, usually does the driving. When pump speed falls 150 rpm. below normal motor speed (1,150 rpm.), the turbine governor opens the throttle valve to keep pump speed at 1,000 rpm. with uninterrupted service.

Standby pump is kept warm at all times by a bypass hookup. In summer, when gas is fired, both pumps are idled by oil discharged from a small Imo 1.5-hp. motor-driven pump.—Power, Dec, p117

More Output, Less Cost

With many selling prices fixed by stiff competition, U. S. manufacturers are carefully studying ways and means of trimming production costs

PRODUCTION COSTS, a constant preoccupation of U. S. manufacturers, is coming in for an increasing amount of attention. Approaches to the problem of cost cutting are taking a variety of forms—from routine reduction in overtime to elaborate company-wide work-simplification programs. Any of the approaches can fit your business. Behind the drive to cut costs:

- Some companies are running into lower sales volume. In such cases, the standard treatment is to cut overtime and make sure that fringe labor costs—indirect labor, maintenance labor—are held to a minimum.
- In other cases, a company's sales may be holding up, but production costs are rising, and sales prices are being held constant by stiff competition.

A New York state order-book manufacturer is typical of the latter group. Labor and materials costs have risen 28% since 1950, prices have risen not at all.

To offset this squeeze, the company, within the last year, has reduced inspection (for a saving of $70,000) and changed production methods (for an increase in output of 28%) without increasing personnel.

In Boston, a paint manufacturer has saved an estimated $200,000 in 18 months. His system has been to make all personnel cost-conscious by publishing an interplant idea letter. Also, company engineers have been touring plants to check on individual items of cost that appear to be out of line.

In still another case, a West Coast aircraft manufacturer expects to save $40,000 this year with a $22,000 investment. The company operates 120 vehicles in its factory area. It is converting them to operate on propane instead of gasoline. The saving: 85% on oil; overhaul every 10,000 hr. instead of ever 1,000; a 60% saving on fuel cost.

It is fairly common knowledge that the potential for cost cutting has been around for a long time. But there has been no pressing need to put the ideas into effect.

A number of companies are cutting costs through packaging techniques. For example, several tire manufacturers are receiving their supplies of carbon black in polyethylene bags. Instead of having to dump the carbon black out of a bag into the chemical mix, they throw in the bag and all and save handling time.

A manufacturer of motion-picture products—cameras, film, and projectors—has switched in the last year from wooden boxes to corrugated shipping cases. The estimated saving for a year is $160,000, principally in the cost of the packaging material.

Big savings are being achieved in production planning. One of the largest copper producers in the U. S. has set up an industrial engineering department within each division of the company with an assignment to find cost-cutting methods. One result: copper recovery has been increased from 800 tons to 1,100 tons per day.

Work-simplification programs are showing up for the first time in many companies. In some of these, management is setting up forums for its supervisors in which the latter are encouraged to study the operation of other departments. This study, it is found, produces a better interchange of ideas than would normally exist, and leads supervisors to examine their own operations more closely.

But cost-cutting isn't always easy. Not the least of the problems is often the chore of selling management on the idea of spending money in order to save money. But to be effective, any cost-cutting program must be built on such fundamentals as job evaluation, work simplification, and better inventory records.—Business Wk, Nov 20, p 54

High-Power Transistor

At Bell Telephone Laboratories, a new ultra-high-frequency transistor (440-million cycles) is assembled in a dry box. Called an intrinsic barrier transistor, it can operate at relatively high power, perhaps up to ½ watt. Possible uses: television sets, portable radios, transcontinental radio relay systems.—Prod Eng, Dec, p197

New Foam from Plastics Has Unusual Properties

Polyurethane foams are getting a foothold in the U. S. market. It will be mid-year, however, before any definite trends show up. Most raw materials now come from Germany, but two companies, American Collo Corp. (New York) and Hudson Foam Plastics Corp. (Yonkers, N. Y.), expect to be in production soon.

Polyurethane foams are made by combining a polyester resin with di-isocyanate. When water is added, carbon dioxide evolves and expands the material. By varying ingredients and techniques, open or closed cell structures can be produced. Different end-product properties can also be produced by simply varying the constituents.

Weights can be varied from 30 kg. per cu. m. to 200 kg. per cu. m. Foams soft enough for powder puffs or hard enough to be used as abrasives can be made. They will not rot, age, or oxidize and are not attacked by oils, greases, or solvents.

Foams will resist boiling water and dry heat up to 350°F. Products range from foam mattresses through household sponges to toothbrushes.—Mod Plastics, Nov, p106

. . . NEW DoALL POWER SAW REDUCES CUT-OFF COSTS 50% OR MORE!

FOUR MODELS — Variable or fixed speeds with manual feed or fully automatic feeding, indexing and sawing. Capacity up to 12" rounds, 12" x 12" flats.

Using DoALL's new *high-speed steel* Demon Saw Band, this saw *cuts faster and with greater accuracy than any other machine* of comparable price and capacity, including power hack saws.

Cut-off costs are drastically lowered through savings in:

TIME — Up to two days' work in one . . . due to faster sawing with controlled speed and feed. With the DoALL Demon high-speed steel blades, tool cost is also substantially reduced — they last up to 10 times longer than carbon steel blades.

LABOR — More production output in less time. One man now turns out work that took two men and two machines in the past.

MATERIAL — Compare the 1/16" kerf cut by the thin, continuous cutting DoALL saw band with 1/8" kerf of hack saw blades or 1/4" cut of a cold saw . . . you save 1/2" or more of costly stock every 8 cuts.

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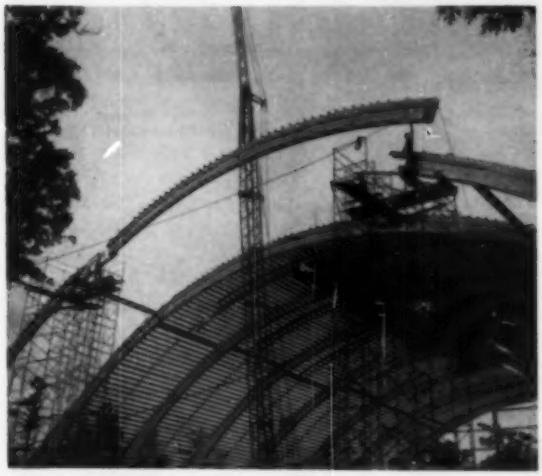
PS-3

Builders Use Crane, Towers to Erect Arches

NINE LAMINATED WOOD ARCHES create a clear span of 190 ft. and a maximum height of some 64 ft. in the Union College field house, Schenectady, N. Y. Each of the three-section timber arches is 254 ft. long and has a cross-section 11 x 40 in. Wood joists, sheathing, and built-up roofing cover the arches. Timber Structures, Inc. (Portland, Ore.) designed and built them.—Const Meth & Equip, Dec, p90

TERMINAL SECTION of laminated timber arch is balanced in mid-air as workmen guide it into foundation socket. Opposite end rests on steel tower.



CENTER SECTION is eased into place between steel straps extending from ends of terminal sections.

HEAVY JOIST is brought up to link terminal section with adjacent arch while other two sections are placed.

SOLID TIMBER GIRTS and prefabricated braces are bolted to arches to carry roof on a tangent from arches.

ROOF JOISTS are raised directly into place by block and falls hung on steel masts clamped to placed joists.

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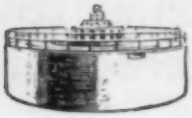
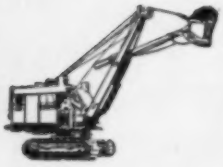


Generators

Rolling-Stock



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Malleable Iron Castings

Hitachi, Ltd.
Tokyo Japan

De-palletizer Feeds 900 Empty Cans per Min.

A new system for de-palletizing empty cans and putting them on a conveyor line leading to filling machines is speeding up operations at The Green Giant Co., a U. S. canning company.

Cans are received in pallet-load lots, each containing 14 tiers of 196 empties—a total of 2,744 cans. Fork truck place pallets on a conveyor that carries them under the de-palletizer, which has a suction head capable of lifting and transporting an entire layer of 196 cans.

In operation, the suction head travels along on a trolley over the pallet loads of empties on a floor-level roller conveyor. The head, attached to a ¾-hp. electric hoist, is then lowered until suction cups rest on the top layer of cans, at which point the load is lifted.

The load is then trolleyed to a conveyor feeding a rotary can unscrambler. The hoist is again lowered until cans are directly over the conveyor. Suction-cup vacuum is broken, and the cans are released gently onto the belt.—Food Eng, Dec, p70

Airconditions Rail Car For 11% of Normal Cost

The Chicago & North Western R.R. has installed, experimentally, a small power plant and two room-type air conditioners in a railway car. If the system is successful, it will reduce the cost of conditioning railway cars from an approximate $18,000 for a conventional installation to about $2,000.

Power plant for the system, installed in the vestibule of the car, is propane-powered and delivers 3,000 watts of 115-volt alternating current to the air conditioners. It also delivers 750 watts of 37-volt direct current for battery charging while standing. A relay is included in the charging circuit to cut out the direct-current power production when the car is moving, at which time the battery is charged by an axle-driven generator.

The air-conditioning units are each of ¾-ton capacity and are made by Duo-Therm (Lansing, Mich.).—Railway Age, Nov 22, p23

International Business Briefs

Paris—Faced with criticism of its operations, Air France has exposed some of its more pressing management problems. Among them: government pressure to utilize French aircraft to support that country's aircraft industry. As a result, Air France now operates seven different types of equipment (see Save with Standardization—p 13).

Havana—A number of Cuban and foreign firms are interested in a $400-million proposed trans-Cuba canal project, according to Cuban officials. The canal would run from Cardenas Bay to Cochinos Bay—a stretch of some 80 km.

Among the advantages to Cuba: an immediate answer to the island's unemployment problem; development of the island's interior with resulting contributions to Cuba's economy, and an improvement in transportation facilities for handling sugar crops.

Cairo—Egypt will relax regulations governing fishing rights in Egyptian waters. For the first time in many years, Egyptians will be permitted to form fishing companies in association with foreigners. Preference for permits will be given to those ship owners who equip their vessels with necessary modern appliances, including cold storage and engines of at least 120 hp.

Helsinki—Finland will raise tariffs subject to the General Agreement on Tariff and Trade (GATT) by 50%. The increased duties will apply to about one-fifth of Finland's imports. The decision will go into effect this year. Coal, coke and fuel oil will continue to be duty-free.

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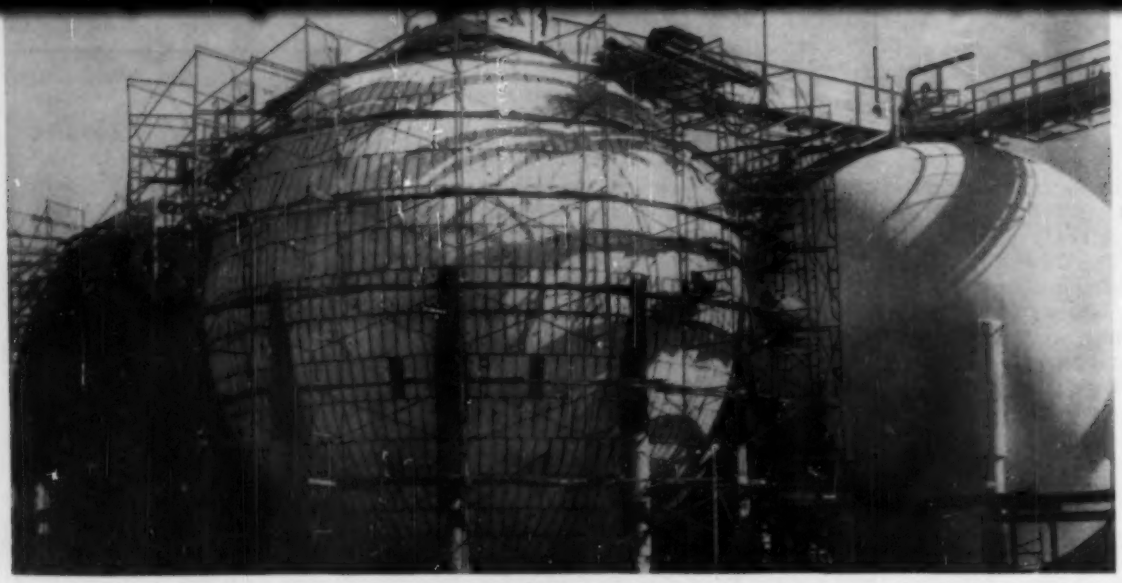
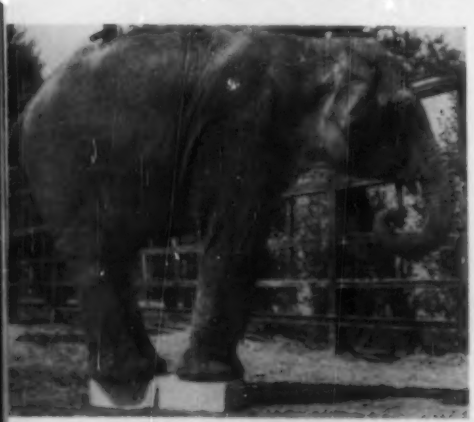


POLYSTYRENE FOAM in precut slabs effectively provides thermal insulation for these 43-ft. diameter Hortonspheres. Another form of polystyrene can be foamed in a mold. Polystyrene is just one versatile material in the battle . . .

Plastics vs. Heat and Cold

Only plastics can offer the properties often needed in thermal insulation. A look at the U. S. plastics industry shows foam leads as insulation material

PIPE is insulated with fibrous-glass-reinforced phenolic in curved shapes.



TWO BLOCKS of foamed polystyrene support a 2½-ton elephant.

LOW THERMAL CONDUCTIVITY — that's a natural property of all plastics. Coupled with moisture resistance, chemical resistance, lightweight, good electrical properties, and the ability to be processed in a wide variety of forms, it makes plastics prime materials for thermal insulation.

One of the oldest applications of plastics as thermal insulation is in the form of a binder for such conventional insulating materials as mineral wool and fibrous glass.

A new plastics application takes advantage of the usual heat resistance of Du Pont's new Mylar polyester film. It is ideally suited as an outer protective covering for cork and other forms of primary thermal insulation.

But foams appear to be taking the lead in the plastics parade of thermal insulators. Plastic foams are highly specialized materials, offering the manufacturer and the refrigeration engineer properties not available in traditional insulating materials.

Some plastic foams currently available can be expanded in place through application of heat or through combination with selected chemicals that act as blowing agents. Others are supplied in the form of boards, rods, blocks. They may be fabricated to size and shape with ordinary wood-working tools. The principal types of plastic foams are discussed below with special emphasis on their use as thermal insulating materials.

Polystyrene: Styrofoam, made by Dow Chemical Co. (Midland, Mich.), is currently the most widely used type of expanded styrene in the U. S. It has a non-interconnecting cell system produced by expanding styrene about 40 times.

Styrofoam has a density of 1.6 to 2.0 lb. per cu. ft.—lowest of all rigid insulation materials. Produced in board form, Styrofoam is easily cut and handled and does not delaminate in service. Highly resistant to rot or fungus growth, it offers no food value to vermin.

The material is widely used as a low-temperature insulating material for walls, floors, roofs, ceilings, sidewalls, and for various types of domestic and industrial refrigeration equipment. A cold-

FOAMED MODIFIED VINYL in mittens, boots, and suits worn by soldiers gives excellent protection against extreme cold. Material absorbs little moisture.

setting asphalt or Portland cement mortar will adhere Styrofoam to walls. Plaster can be applied directly to its inner face.

Newest type of styrene foam to reach the market is expandable polystyrene beads, introduced by Koppers Co., Inc. (Pittsburgh, Pa.). With this material, polystyrene can be foamed to shape in a single operation by industrial processors. Marketed as tiny, hard particles of styrene incorporating a blowing agent, this material requires only the application of heat to produce a 20 to 30 fold expansion in volume. By confining the styrene beads in a mold during the heating process, intricate, expanded objects of controlled densities can be produced.

Cellulose Acetate: Strux is a cellular cellulose acetate made by Strux Corp. (Lindenhurst, L. I.) under license from E. I. du Pont de Nemours & Co., Inc. (Wilmington, Del.). Produced by an extrusion process in boards up to 1 by 4 in. in cross-section and in rods up to 2¼ in. in dia., Strux also has non-interconnecting cells.

Easily bonded to glass cloth, glass mat, metal, or wood with polyester and other resins, Strux lends itself to production of laminated sandwiches. It resists temperatures up to 350° F. for long periods and has a high strength.

Vinyl Foam: Foams based on polyvinyl chloride are available in both flexible and rigid forms. It can be readily bonded to wood, metal, glass, and other materials. It is vapor proof, lightweight, and fire resistant. In its flexible form, the material is used for shock absorption, gasketing, and weatherstripping. It can be shape-molded.

Copolymer: U. S. Rubber (New York, N. Y.) makes expanded Royalite. This is a chemically expanded, unicellular copolymer of butadiene-acrylonitrile and styrene-acrylonitrile. Royalite finds application for high impact energy absorption, as a flotation material, and for equipment housing where electrical insulation is needed.

Phenolic: Westinghouse Electric Corp. (Pittsburgh, Pa.) is one supplier of a phenolic foam material that can be foamed in place. It can be converted from a liquid resin to an expanded solid without the addition of external heat or pressure. The expanding material will assume the shape of the cavity in which it is formed.

Urea: Urea foam, made by Colton Chemical Co. (Cleveland, Ohio) has a density of 0.8 lb. per cu. ft. and is one of the most efficient insulators available. Density can be varied to meet specific needs. Supplied in block, slab, and shredded form, the material is easily installed in regular or irregular spaces. It may also be surfaced with paper, cloth, or resin.—Mod Plastics, Dec, p87

Synthetic Mica . . .

. . . on production basis will compete with natural mica. New product offers better heat resistance

TO REDUCE ITS DEPENDENCE on imported mica, industry in this country has long searched for a synthetic substitute. The problem is to find a product that can compete with Indian mica on a price basis. Imported mica, mined and shipped by cheap labor, sells for as little as $1 per pound.

Mycalex Corp. of America will try this year to produce a substitute product that, they hope, will obtain for them a share of what is in all a $30-million market. Capacity of their plant will run to 1,000 tons per year, or about 10% of total 1954 imports.

Production plans center on use of an electric arc furnace that will take 25 tons of raw materials at a time. At first, these materials will be used in their purest state, mixed carefully before they are poured into the furnace.

The furnace itself is a steel cylinder, about 10 ft. in dia. and about 10 ft. high. Two sticks of graphite, about 5 ft. apart inside the cylinder, act as electrodes.

The electrodes are almost covered with raw chemicals when the process begins. A thin layer of graphite between the electrodes carries the initial surge of current.

The high resistance of the mix boosts the temperature within the furnace high enough to melt the mix in the center and cause the mix on the outer surfaces to solidify. This operation takes about 80 hr.

The hot mix is permitted to cool between a week and 12 days, after which time the furnace is opened. The result: a high mound of solid white mica.

Difference between natural and synthetic mica is apparent under heat. At approximately 650° F., natural mica begins to lose its structural strength and get soft. Synthetic mica, under parallel circumstances, will retain its strength up to 950° F.—Business Wk, Nov 20, p59

Nickel-Plating's Effect on Aluminum Alloys

Aluminum's lightweight and nickel's corrosion resistance suggest numerous uses where erosion and abrasion are important factors on lightweight structures. So Wright Aeronautical Div., Curtiss Wright Corp., initiated a test program on nickel-plated aluminum alloys. Its purpose was to find answers to practical problems that might face users of plated aluminum. Results were:

- **Properties** of plated alloys permit its heat treatment and fabrication with but little deviation from standard procedures.
- **Corrosion-free service** can be obtained by proper selection of aluminum alloy and plating thickness.
- **Aluminum sheet** can be plated before rather than after all forming, bending, and heat-treating operations. This insures coatings of uniform thickness, regardless of shape or complexity of finished product.
- **No separation** of plating from aluminum occurs when nickel is plated over an oxide coating formed by phosphoric acid anodic treatment.
- **Yield strength** increases with the plating thickness; endurance strength is not affected by plating. —Prod Eng, Dec, p167

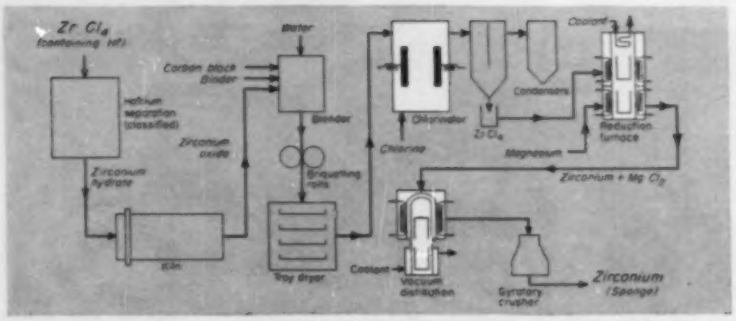
Textile News Briefs

▶ **Arnel is the name** given to the cellulose-triacetate fiber, developed by Celanese Corp. of America. Arnel offers ease of processing, affinity for blending with other fibers, high receptivity to dyeing and finishing, and low price.

▶ **A rayon tire yarn** of high strength and improved fatigue characteristics is in production by American Viscose Corp. A 1,650-den. yarn is now available.

▶ **A 100% Dacron felt** has been developed by Du Pont. The process will be licensed.

▶ **U. S. fiber consumption** per-capita in 1953 increased to 41.1 lb., up 0.5 lb. Major fibers: cotton, 28.3 lb. (up 0.1); wool, 3.1 lb. (up 0.1); rayon and acetate, 7.7 lb. (steady); other synthetics, 1.8 lb. (up 0.2).—Textile World, Dec, p205



FLOW DIAGRAM shows how hafnium-bearing zirconium tetrachloride is processed to . . .

Zirconium for Reactors

As more countries enlarge their nuclear-reactor programs, they will need more zirconium — a material highly essential in reactor construction

THE WORLD'S NINTH most abundant metal, zirconium, would still be just an element on the periodic table if it were not for the nuclear-energy program. But zirconium has the valuable property of allowing neutrons to pass through it, instead of absorbing them.

To meet the surging demand in the U. S., Carborundum Metals Co. (subsidiary of Carborundum Co.) plans to increase output of its plant at Akron, N. Y. Carborundum starts with zirconium tetrachloride containing 2½% hafnium. As hafnium absorbs neutrons, it must be separated from the zirconium—a knotty problem as the two metals have similar properties.

The separation process used by Carborundum is classified (that is, no information can be released by government order). Zirconium emerges from the separation process as the wet, hydrated oxide, which is dried in a kiln at 1650° F. Dry oxide is mixed with carbon black, an organic binder (such as sugar), and water, then briquetted on a roll-type briquetting machine.

Briquettes, dried in a tray dryer at 250° F., are chlorinated in a silica-brick-lined vessel having three graphite electrodes projecting into the vessel about halfway up its sides. Heat is generated by passing three-phase current through the briquettes. Heated chlorine gas enters at the bottom, zirconium chloride vapor passes out at the top.

The vapor crystallizes in a condenser next to the chlorinator. An aftercooler completes condensation. Crystals charged to the reduction furnace are reduced by molten magnesium to sponge metal.

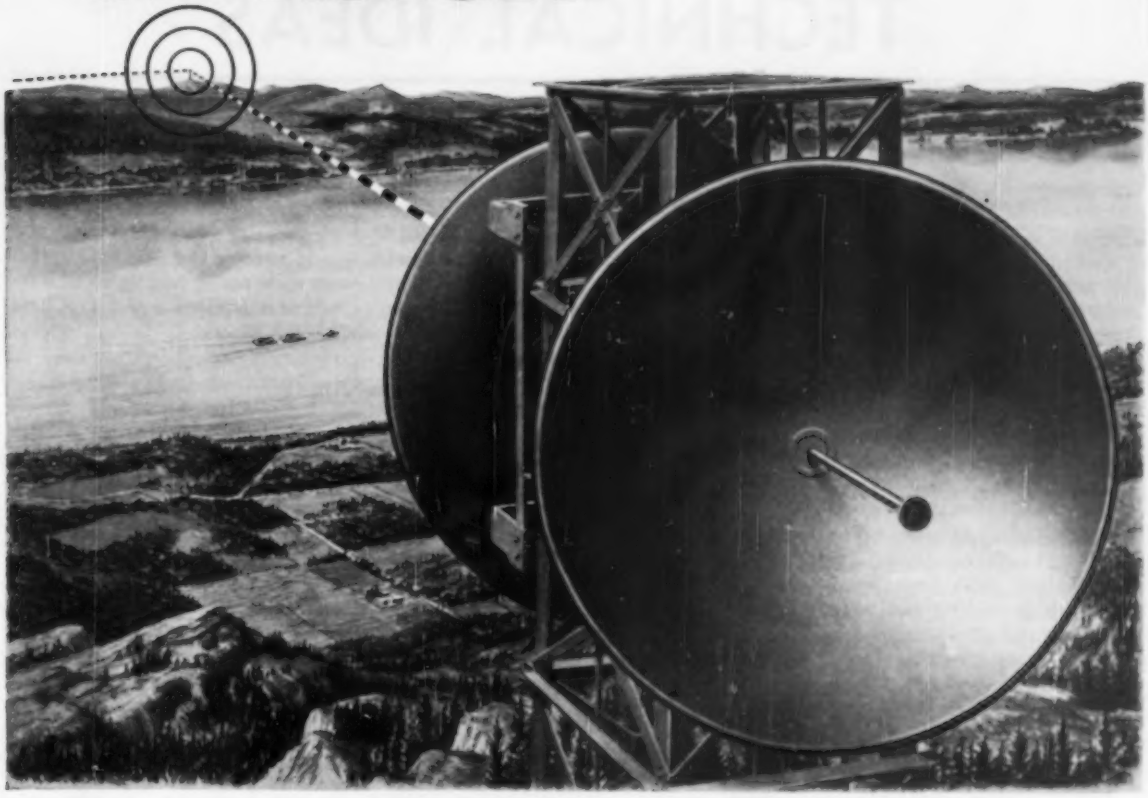
Electric coils in the furnace vaporize the zirconium chloride and melt the magnesium. The vapor, on the surface of the molten magnesium, reacts to form metallic zirconium and magnesium chloride. Zirconium settles to the bottom as the magnesium chloride floats above it.

The zirconium, collected in a drum, is taken from the furnace, most of the magnesium chloride is chipped out, and the drum goes to a vacuum still. It is placed in the upper part of the still in an inverted position, and a drum to receive and condense the remaining magnesium chloride is placed in the lower part. An electric heater heats the upper part of the still to 1650° F. while cooling water circulates around the lower part to condense the vapors.

Cooling shrinks the sponge zirconium so it can be removed easily from the drum. It is broken up, then ground in a gyratory crusher to pass a ⅜-in. screen. Fines are separated as they are usually high in impurities.

Present production of 150,000 lb. per year is all sold to the U. S. Atomic Energy Commission at "less than $15 per lb."—Chem Eng, Dec, p112

"ON TARGET"



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Microwave was successfully demonstrated for the first time in 1931 by International Telephone and Telegraph Corporation. Today this system, developed and improved through the years, is made available outside the United States through ISE, associate of IT&T. Would you like the facts on what microwave can mean to *your* communications? ISE engineers will be happy to consult with you.

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TECHNICAL IDEAS

Roller Densifies Fills—Vibrating road roller that weighs 3 tons compacts granular fills. Made by Vibro-Plus Products, Inc., it consists of a 4-ft.-dia. steel roller with a 25-hp. engine mounted on its frame. Power is transmitted to independent races that rotate two balls in opposite direction inside the barrel of the roller. At 1,600 rpm. the balls produce a direct downward centrifugal force of 7 tons.—Const Meth & Equip, Dec, p94

Ceramic Automation—Crane Co. at its Colton, Calif., plant casts closet bowls on three automatic conveyors, each having an automatic slip casting mechanism and dryer unit. Electric switches and air cylinders control movement and positioning of molds on roller conveyors.—Ceramic Ind, Nov, p76

Furnace Burns Two Fuels—Champion Paper & Fibre Co. has installed a furnace that burns unhogged bark and coal in combination or alone. Bark is fed by pneumatic distributors and coal by mechanical feeders. Coal supplements bark and evens out the steam flow. No storage space is needed for the bark.—Paper Ind, Nov, p812

Automobile Accidents—First results of an exhaustive study of the causes and effects of automobile accidents may change some popularly accepted ideas. Says the Cornell University study group: being thrown out of the car doubles the chance of injury. There is little difference from a safety standpoint between positions in the front seat. But the back seat is three times safer.—Business Wk, Dec 4, p80

Hydraulic Concrete and Rock Buster

Multiple-piston hydraulic jack breaks off 1- and 2- cu. yd. pieces of concrete or rock. Maker, K.O. Duncan Co. (Los Angeles, Calif.), claims the tool will develop a 150-ton thrust. In service, the Roc-Jak is inserted into a drilled hole, a steel shim serving as a bearing surface is put in, and a pump actuated to expand the Roc-Jak. After pistons contact the shim, an additional ½-in. piston travel breaks the mass.—Const Meth & Equip, Dec, p93

Feed Supplement — Basic Research Corp. (Washington, D. C.) has developed a new continuous-flow process for production of high-protein sea algae. It promises to yield a 4 to 6¢ feed supplement to improve food value of livestock and poultry rations.—Chem Wk, Nov 27, p80

Cuts Tool Cost—Replacing single-point carbide tooling on an 8-spindle automatic with Kennametal Kendex tools (which provide three or four cutting edges) cut tool cost by 59%. SAE-1020 liner rings are cut at a feed of 0.006 in. per rev. and speed of 570 ft. per min. Production rose 300%.—Am Mach, Nov 22, p146

Graphite Anode—A new anode of graphite rods and insulated wire has been developed by Philadelphia Electric Co. for cathodic protection of lead-sheath cables in ducts. The new anode has a longer life than the metallic-ribbon type but is otherwise similar. Its life is expected to exceed 30 yr.—Elec World, Nov 15, p140

Tape Aids Plating—Masking tape protects parts and assemblies during electroplating. The part of the item to be shielded from plating or acid bath is covered with masking tape, manually applied with considerable pressure. The tape, called Scotch Tape No. 470, is made by Minnesota Mining and Mfg. Co.—Electronics, Nov, p238

Aluminum Briefs—Molybdenum and tungsten sandwiched between aluminum will withstand 3600°F. Aluminum jacket protects the metals from oxidation . . . Aluminum solar cookers have been developed by the National Physical Laboratories of India. Aluminum sheet, pressed into concave shape and highly polished, reflects the sun into a cooking utensil. It has the heating capacity of a 400-watt electric oven.—E&MJ Min & Met Mark, Nov 18, p7

Bolt and Washer Assembly—Automatic Telephone & Electric Co. (Liverpool, Eng.) has worked out a simple device for the pairing of bolts and washers. Instead of picking up washers from a tray with one hand and bolts with the other, AT&E has about a hundred washers spread in front of the assembler on a ¼-in. thick sponge rubber pad. Bolts can be picked up with one or both hands and pressed into washers as they lie on the pad; then the assembled pair is picked up.—Electronics, Dec, p228

Push-button Lubrication — New Lincoln and Mercury automobiles have, as optional equipment, a system to lubricate the car at a touch of a button. If this idea develops into a trend, you may see: elimination of lubrication equipment in service stations, lubrication service performed at gasoline-pump island by replacing lubricant can, less need for employee training, little need for lubrication hoists.—Nat Pet News, Dec, p46

Faster Papermaking—New sulfite pulping process cuts cooking time by 30% with neither loss in quality nor need for extensive sampling of pulp and cooking liquor. United Paper Mills, Ltd., (Valkeakoski, Finland) developed the process.—Chem Eng, Nov, p99

Forging Alloy—Aluminum Co. of America has announced a forging alloy, X7079, that does not distort when machined. Alloy is now limited to die and hand forming jobs. Research is underway to apply it to heavy plate and extruded sections.—Prod Eng, Nov, p5

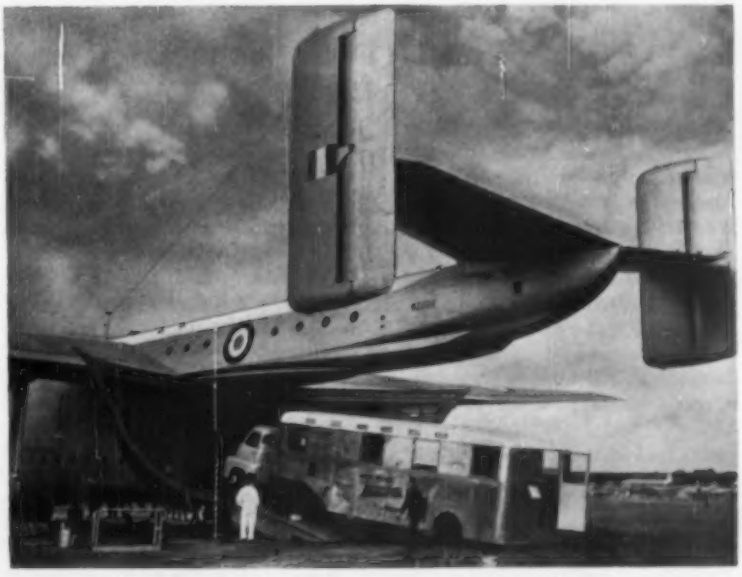
Dehumidifiers Stop Rust—Eight dehumidifiers save Racine Hydraulics & Machinery Inc. (Racine, Wis.) $4,000 a year in extra cost for repair of rust damage on process metals. Made by Westinghouse Electric, units reduce relative humidity in storage area 20%. —Factory, Nov, p151

Light-stable Polystyrene — Dow Chemical Co.'s Styron 647 is eight to ten times as stable in the presence of light when compared with general-purpose polystyrene. Other properties are unchanged. Stabilization results in non-yellowing crystal and white colors.—Mod Plastics, Dec, p248

Transistor Computer—More than 2,200 transistors replace 1,250 vacuum tubes in International Business Machines Corp.'s experimental computer. Power required is only 300 watts—5% of that needed for a similar conventional computer with vacuum tubes. And it's only half the size.—Control Eng, Dec, p11

This Package Sings—Competition among cereal makers is bringing out new packaging and sales ideas. General Mills Wheaties package talks, sings, and plays a tune. Glued to the front of each carton is a phonograph record. It is pressed in acetate film only 0.003 in. thick. Just cut on the dotted line and play.—Mod Packaging, Nov, p132

For Better Hearing—A plastic radio headset weighing only 1.6 oz. has been announced by Telex Inc. (St. Paul, Minn.). The set consists of a sensitive plug-in mechanism, thin stainless-steel headband, and two transparent Plexiglas air cushions that fit over the ear. Sound is piped to the cushions from the radio receiver through plastic tubing.—Aviation Wk, Nov 15, p72



Makes Pipe at Point of Use

New self-contained plastics-pipe factory is designed to be transportable by air and moved by road as a complete unit. It requires only a source of electric power and a supply of plastic material to produce pipe up to 6-in. ID. Equipment includes an extruder that will handle all thermoplastic materials without change in the mechanism. It will process 75 to 100 lb. per hr. or 120 ft. per hr. of 4-in. pipe. Only two men operate extruder. Storage is provided for a two-day supply of raw materials. R. H. Windsor Ltd. (England) makes the Plastomobile.—Mod Plastics, Nov, p118

MOTOR NOISE can be measured extremely accurately in General Electric Co.'s new anechoic sound chamber.

Hums, clicks, whistles, roars—all are commonplace today in working and living areas. So progressive management men are taking a more active interest in noise and noise abatement, realizing that too much noise leads to lower productivity.

To bring you specific methods of reducing the noise of the products you make, we here use an induction motor as an example of noise reduction because it includes a variety of typical noise sources—magnetic, air turbulence, and mechanical

Keeping Your Products Quiet

MUCH EFFORT has gone into determining the design factors that can minimize the noise-producing potential of a product. It is realized that design for control of noise is a separate problem; it must be integrated into standard design procedures just as appearance design has become part of product engineering.

Let's look at a few fundamentals. Air-borne sound is the result of a *force* that causes a part to *vibrate*. Then the vibrating member or another part to which the energy is *transmitted* acts as the noise *radiator*.

Sound measurement is based on either the acoustical-power level or the sound-pressure level. Acoustic power is expressed in watts or in decibels, with decibel ratio based on a reference level, usually of 10^{-16} watts. Thus, the table on the next page gives acoustic power levels of a number of sources, plus sound levels of typical sources as measured by a sound-level meter.

How much sound is acceptable? That depends on the location. Here are a few recommendations: radio and television studies, 26-32 decibels; theaters, 32-36; hospitals and classrooms, 36-42; homes and hotels, 36-46; private offices, 42-46; large public offices, banks, and stores, 46-56; restaurants, 52-56; factories, 46-80.

Now let's examine noise reduction in an induction motor. Its three principal sources of noise are (1) magnetic, (2) cooling air, (3) mechanical. Importance of noise source varies with motor size, with magnetic noise the worst in small motors and cooling-air noise the worst in large motors (over 1,000 hp.). In medium-sized motors, ball bearings introduce noise problems.

1. Radial magnetic forces acting in the air gap between rotor and stator cause magnetic noise. Forces are periodic, almost always non-sinusoidal and occur in harmonics of the fundamental. They are most harmful when their frequency and pole structure coincide roughly with the resonance of either rotor or stator. A noise spectrum of a motor (a plot of frequency vs. decibel level) reveals the dominant noise frequencies.

Proper sonance design can avoid low-order pole structures—the potential noise producers. Methods include:

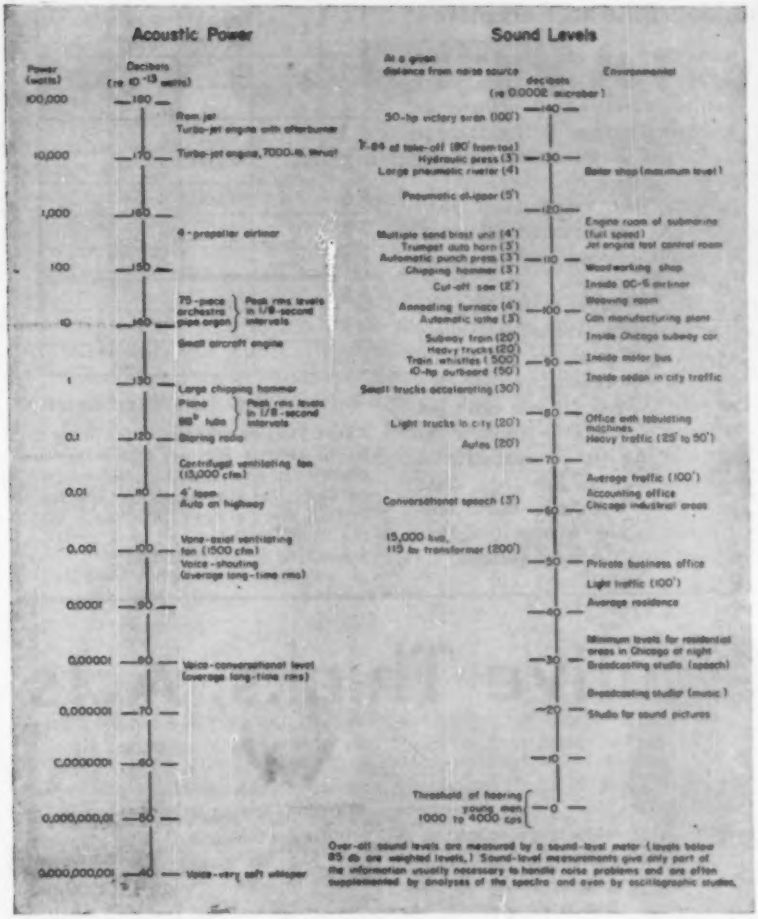
- Selection of the right number of slots in rotor and stator. Motors with certain slot combinations are extremely noisy; others tend to be quiet.
- Skewing of rotor slots. Desirable skewing is usually equal to the pitch of one or two rotor slots.
- Reducing number and magnitude of mechanical imperfections of motor parts. Rotor and stator eccentricity and out-of-roundness can be particularly troublesome. Close tolerances and good quality control can reduce their effect, even though relatively small imperfections can appreciably raise the noise level.

2. Cooling-air noise is caused by (1) turbulent air flow, (2) resonance of parts in the air stream, such as fan blades, and (3) siren effect. Air flowing over and around many sharp-edged surfaces is turbulent; it produces a shushing sound.

In large installations, acoustically-treated inlet and exhaust duct work can reduce noise. In smaller motors, this method is not practical so noise is better eliminated at its source.

Air noise level increases with fan diameter, air volume, and speed. Any change to make the air less turbulent reduces the noise level correspondingly.

Siren effect is caused by cooling air flowing radially through rotor slots, across the air gap, and out the stator slots. The noise level may reach as high as 105 decibels in a 1,000-hp. motor. Setting back rotor and stator conductors away from the air gap and streamlining the rotor exit and stator inlet areas can reduce noise level by 20 decibels.



ACOUSTIC POWER in watts and decibels is shown on the left for various sound sources. On the right are sound levels measured by a sound-level meter of a wide variety of industrial and other common, every-day noise sources. Table is from "Handbook of Noise Measurement" by Peterson and Beranek.

3. Among the causes of mechanical noises are rotor unbalance and the bearings. Careful balancing can reduce the effect of unbalance. Also, resonant vibration set up in the mounting structure by rotor unbalance can be counteracted by a properly designed resilient mounting.

Bearing noise in a motor can be reduced considerably by using sleeve bearings rather than ball bearings. In one class of ½-hp. motors made with both sleeve and ball bearings, the bearing noise of the sleeve-bearing motors amounted to 30 decibels, compared with 35 to 50 decibels (with an average of 45 decibels) for the ball-bearing motors.

The most severe mechanical noises result from resonance rather than forced vibration. Resonance excited during normal operation leaves the designer with the poor choice of designing around certain critical frequencies or requiring that noise-producing forces from all sources be eliminated. The usual compromise solution is to design major motor parts with resonant frequencies away from 120 cycles per sec. or integral multiples and to specify tolerances, clearances, and fits as close as can be met in production.

In the design of moving machinery, no engineer can design around all critical frequencies. He can consider only the worst offenders. He can then concentrate on eliminating noise-producing forces, interrupting the energy transmission, and reducing as much as possible the effectiveness of the noise radiator.—Prod Eng, Dec, p140

Special Equipment Rebuilds Old Canal

Contractor Brown & Root Inc. had to reconstruct 13½ miles of unlined sloughed-bank ditch that supplied 30-million gal. per day to the Houston, Texas, water purification plant. A 200-mgd. canal was needed. To reshape and reline the old canal, the contractor developed special methods and tools. Here's how he did it:

Muck and debris were stripped by graders operating along the slopes. Next, levees were brought to proper grade for laying rails for canal-lining equipment that was to follow later. Side slopes were made flat enough for normal sheepsfoot rolling.

For semi-finish grading, special V-shaped blades that matched the canal's width and side slope were attached to bulldozers. Spoil was removed by clamshell or dragline.

A train of rail-mounted canal-lining equipment, led by the trimming machine, followed the trick dozers. All equipment was standard except for the jumbo that laid reinforcing mesh. On this machine, welded wire fabric was laid from seven reels as the train advanced.—Const Meth & Equip, Dec, p52

Photos Cut Shop Costs

Photography makes fast, accurate records of machine-tool setups at Wheeler Service (Cambridge, Mass.). It has replaced sketching and descriptions of tools and tooling arrangements.

Photographs are made for all setups that operators find difficult to remember. This not only speeds up future setups but also standardizes them. Photographs are stored in the toolroom so operators have free access to them.

Other uses of photography at Wheeler include recording of new or unusual jobs, step by step; photographing hazardous conditions; sending pictures of broken parts to manufacturers when no parts lists are available; proving claims on goods damaged in transit; recording "Do's and Dont's of Safety" for posting at machines.—Am Mach, Dec 6, p134

Ten Signs You're Not Thinking Like an Executive

1. You don't feel you're in control of your job. You fall a little further behind each day.
2. Major decisions are nearly impossible to make. Minor ones nibble away at your confidence.
3. You day-dream, especially in time of crisis. Or get to thinking, "If only I had known that."
4. When things go wrong, first thing you do is look for someone to blame.
5. You've got the feeling your boss sees you exactly as you think you are. You're always hiding something.
6. You're sure the only way for you to handle strong subordinates is to get rid of them.
7. You can't seem to get along with your associates. Or you're sure they are cheating on you.
8. It's been a long time since you've admitted a failure as your own responsibility. You've developed a knack of shifting the emphasis elsewhere.
9. You just can't keep your temper. You're alternately losing your temper and trying to make amends.
10. You respond to the urge to get away from the job when pressures are high. Or, for no controllable reason, you get sick at crisis time. Or you can't get through the day or night without a drink—or several drinks.

Refer to this list from time to time. You can catch tendencies in the wrong direction before they become serious.

	Always?	Most of the Time?	Some Times?	Not At All?
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Better Check the Scoreboard

Check your symptoms on the scoreboard above. But don't let a poor score hurt your morale. No one is perfect. But if most of your checks fall in the "always" or "most of the time" columns, you have really something to worry about!

How an Executive Thinks, Acts

THE SUCCESSFUL EXECUTIVE makes a career of studying each job he holds to determine what its objectives are and what it will require of him personally. He achieves success thereafter by developing himself to meet the job requirements.

Some important characteristics of the successful executive are:

- He knows his capabilities—and limitations.
- He regards himself as a professional administrator.
- He is a student of human nature.
- He knows how to think straight.

There are at least 14 ideas—probably many more—that smart executives use to supplement the normal thinking process. Here they are. You can use them to increase your personal effectiveness on the job.

1. Avoid crisis decisions. To dash about is amateurish.

2. Distinguish big from little problems. Weigh the benefits you'll get, or the headaches you'll avoid, by taking corrective action. That will show you when an all-out effort is called for. You will have to be able to sense a critical situation and rise to it.

3. Organize for delegation. In their simplest form, these words mean looking over your job responsibilities to make sure someone is regularly assigned to every one of them. And, without giving license, make sure that each person has authority to carry out his own responsibilities. It may help to chart what you do and what you delegate.

4. Rely on policy to settle routine problems for you. Reduce repetitive decisions to policy. Let your subordinates know what you want them to do.

5. Rely on others for counsel and advice. You can't know all the answers. It's smart to solicit guidance from your associates and superiors.

6. Use good communications to anticipate trouble. Make a regular practice of talking with your staff, formerly and informally. Gossips and tale-bearers are of no help.

7. Pace your thinking efforts. Don't face each problem as if it were a major crisis. Rise to the tough ones, but learn to regard most decisions as routine.

8. Establish a control system. Key to decisive action for many successful executives is a control system that alerts them when critical factors are getting away from expectations.

9. Set up guides for handling your human-relations problems. Try to develop the habit of dealing with people in a way that is psychologically sound.

10. Develop the habit of concentration.

11. Take your time. Some things need immediate action. Others can wait a day or two.

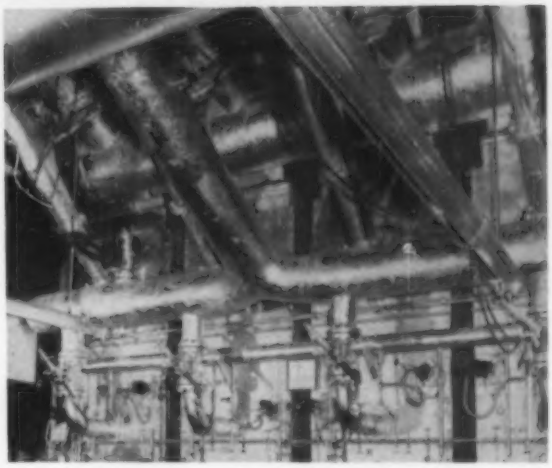
12. Don't expect every decision to be the right one. Know what kind of results to expect from the decisions you make. Study the field so you know your chances of being right—or wrong. In making a decision, it is difficult to be completely right.

13. Draw a picture of your problem. On paper, your main ideas can be emphasized graphically, less significant ones shown in modifying position and size.

14. Have alternate solutions ready. Situation and facts keep changing. So it's a wise thing to come up with at least two answers for each problem. Keep the secondary one in reserve.—Factory, Dec, p100

New Ideas Tell How To . . .

. . . insulate against noise



Mineral wool not only insulates heat flow, it can also insulate against noise. The Long Island Lighting Co. (New York) is using it this way in one of its power plants. Fast flowing natural gas in burner supply lines produced a piercing shriek. When these lines were insulated with mineral wool, the noise was cut to such an extent that it is now inaudible.

Illustration shows insulated T-shaped pipe above the burners of a boiler. The only purpose of the insulation here was to cut noise. Insulation consists of a single layer of 1½-in.-thick mineral-wool felts and two ½-in.-thick layers of insulating cement. Felts were wrapped around gas line and tightly secured with 20-gage wires circling insulation on 8-in. centers. The job was finished with asphalt mastic and aluminum paint.—Power, Dec, p120

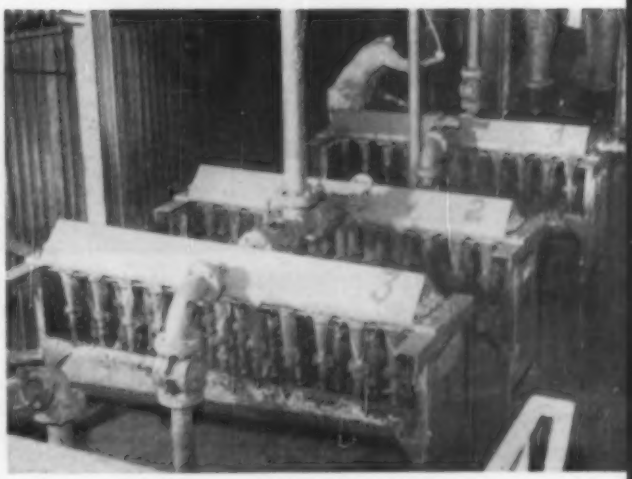
. . . melt refractory materials

General Electric research engineers are here examining 50-lb. ingots of molybdenum and titanium that were melted in a new multi-purpose, inert-gas arc furnace. Developed by GE, the furnace melts materials usually considered too refractory for commercial production.

The furnace uses direct current and a non-consumable electrode. Now being designed is a consumable-electrode furnace capable of operation to one hundred-millionth of an atmosphere and at temperatures up to 12000°F.

Research is underway with the present furnace to develop a technique to make a titanium electrode. If the technique is successful, the electrode will be made continuously within the furnace itself.—Prod Eng, Dec, p198

. . . stop stream pollution

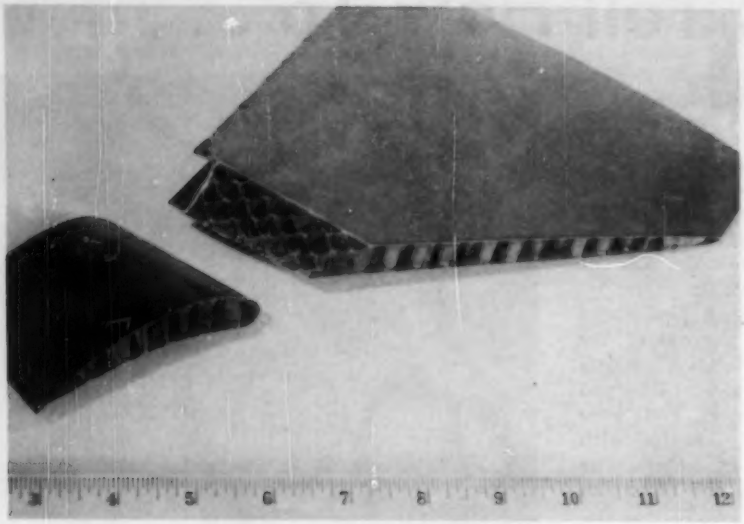


Wet-type cleaning plants in the coal-mining industry are often faced with the problem of preventing stream pollution. Several methods are available and usually the extra equipment needed is paid for out of coal that formerly would be wasted. An analysis of your plant will tell what equipment is best for you.

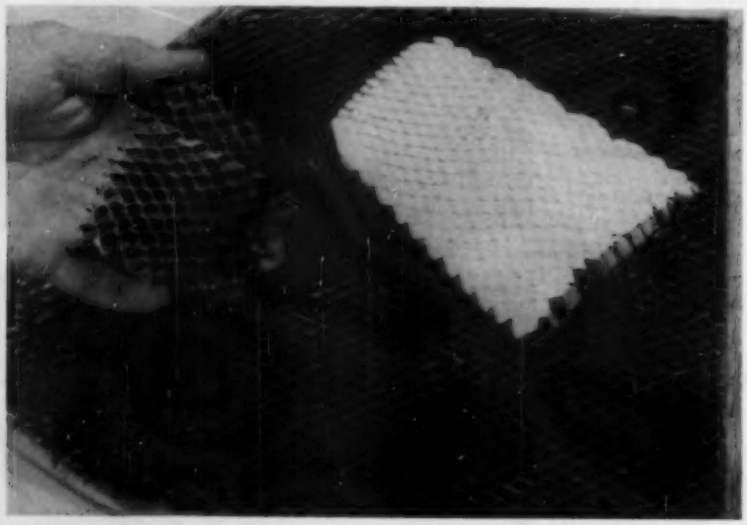
Closed circulating-water systems cut stream pollution. For fine coal, the system combines two-stage cyclones with filters for removal of solids (right). It works best where run-of-mine coal is washed down to zero.

Sludge ponds hold waste slurry. Cyclone thickeners and vibrators will reduce the load on the pond and cut danger of pollution. Coarse-coal circuit can be used where coal is not washed to zero. This system teams cyclones with a vibrator to remove solids. Overflow returns to washer.—Coal Age, Dec, p62

Metal Honeycomb Stops Heat



BONDING: Two principal approaches to the problem of attaching the core to the sandwich were tried: welding and brazing. Solar Aircraft has developed a line of high-temperature brazing material for honeycomb structures that meets requirements completely. In the experience of Solar's engineers, only brazing assures a continuous, high-strength metallurgical joining of components. Because of the formation of fillets between mating surfaces, greater bond area results with attendant uniform stress distribution. Parts shown are experimental; they are turning vane and missile fin section.



CORE CONTOURING: Machining or grinding flat honeycomb core is not difficult if the core can be collapsed for the operation. If not, a problem results as tolerances for brazing must be within ± 0.002 in. One contouring method freezes the expanded core in ice with milling done at sub-freezing temperatures. Another technique uses a plaster composition to hold the core for contouring. Electrical disintegration is another core-contouring technique. Picture above shows a piece of core frozen in ice, ready for milling.

AIRCRAFT ENGINEERS, long preoccupied with considerations of high strength and low weight, have added another factor to their problems—temperature. With the coming of jet and rocket propulsion, temperatures, both inside and outside the aircraft and missiles, have become critical.

Titanium alloys show promise for temperatures up to 800° or 900° F., and stainless steel can be used in even greater heat. But the weight of these materials rules them out for certain applications. Today it appears that the answer may lie in honeycomb construction.

In itself, honeycomb construction is nothing new. The new twist supplied by the aircraft industry lies in the process of bonding a *metal* honeycomb to a *metal* skin to form an all-metal sandwich. To date, the resulting material is still in the testing stage, and no known applications have yet reached the production stage. The potential: a practical solution for elevated temperature applications up to 1500° F.

Steel and high-alloy sandwich core usually is manufactured in square, hexagonal honeycomb, or wave-form cell types, although many other special core designs have been produced experimentally.

The square-cell core is manufactured in the fully opened condition, and it may be collapsed if grinding or machining operations are required.

Characteristics of the metal honeycomb include:

- High strength-to-weight ratio.
- Extremely high stiffness factor.
- Good thermal resistance.
- High vibration dampening ability.
- Excellent fatigue resistance.
- Acoustical insulation.

Improved thermal shock and erosion resistance is anticipated by utilizing a special graphite filling in place of refractory alumina.

Solar Aircraft Corp. (San Diego, Calif.), which is carrying on a program of study and development of the new material, feels that all-metal sandwich structures should eventually find broad application in the aircraft and allied industries.—Aviation Wk, Dec 6, p40

History Card Records New-Product Progress

Development of new equipment and getting it into production involves many people, many discussions, many records. George Kent Ltd. (England) keeps track of decisions and coordinates activities by project history cards.

Each tracing released by the research and development group has a project history card made out on receipt by the projects department. Designed for visible filing in a Remington Rand Kardex file, it carries information on initial production batches, tooling progress, print issues, modifications, and so on. This card is supplemented by project contact, or follow-up, cards and project modification cards.

Project contact cards are made out by the project engineer whenever he wants to record the essentials of a discussion or make a follow-up on a certain date. Such information is then entered on the history card, and the contact card is filed under the call-up date.

Likewise, the engineer makes out a modification card before the draftsman can change a tracing. This information also is recorded on the history card.

The system keeps a record of all decisions made, all actions taken. Reference to the history card keeps everyone informed and, importantly, it ensures that small details are not overlooked.—Mach, Dec 10, p2177

Conveyor Is Spill-Proof

A zipper belt conveyor solved the problem of moving bead catalyst to storage at Continental Oil Co.'s Lake Charles, La., refinery. Buildings blocked a ground-level route; foundations and pipe lines blocked an underground route. So it was necessary to go overhead.

The overhead belt conveyor runs 250 ft., travels 106 ft. per min., moves 10 tons per hr. Belt is cupped at loading chute by rollers, then is closed at its top by meshing zipper teeth. At the discharge end, the zipper opens to drop the load into a chute. If the belt unzips elsewhere, it automatically stops so no material is spilled.—Pet Proc, Dec, p1885

SHAWINIGAN
Acetic Acid . . .
For Finer Textiles
Shawinigan's Acetic Acid is manufactured to meet the highest standards of the textile industry. It is a chemical vital to the production of consistently-fine cellulose rayon and to the colorful dyeing and printing of fabrics.
Shawinigan Chemicals Limited, one of the world's large producers of Acetic Acid, supplies this product to textile fabricators and other users in many countries throughout the world. These users have learned from past experience that a better product always results when only the finest chemicals and raw materials are used in its manufacture. That's why Shawinigan's Acetic Acid and its entire range of fine organic chemicals are designed to assure only top quality wherever and whenever they are used.
OTHER USES
Manufacture of cellulose acetate which is used in the production of lacquers, plastics and photographic films.
Starting material in the manufacture of acetic esters used as lacquer solvents and plasticizers.
Metallic salts of acetic acid as mordants in the dyeing industry.
Raw materials in the manufacture of dyes and pharmaceuticals.
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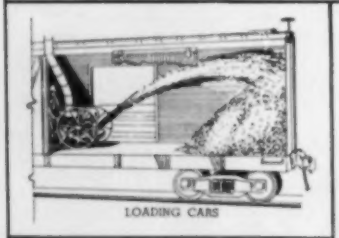
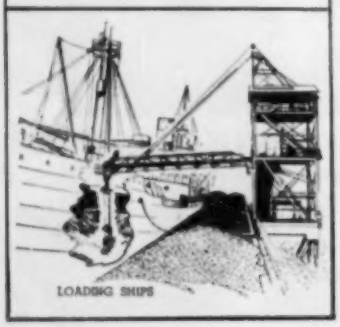

LOADING CARS


LOADING SHIPS

STEPHENS-ADAMSON EQUIPMENT MOVES BULK MATERIAL AT THE LOWEST COST PER TON

Stephens-Adamson Ship Trimmer units make the loading and trimming of bulk cargo a fast, easy, low-cost operation. Ideal for grains, sugar, and similar bulk materials . . . permit ships to make more trips by drastically cutting the port time. Capacities vary according to materials and conditions, but tonnages up to 1500 TPH may be handled by the various styles and sizes of S-A Ship Trimmers.

Stephens-Adamson Throwers load and trim bulk materials into railway cars at rates up to 350 tons per hour...and will also pile and store bulk materials in warehouses and out door storage piles . . . they are excellent for disposing of mine tailings. Only part time attention of one man is required to position loader and direct feed. Powered by electric motor. Portable units may be equipped with gasoline engine.

Stephens-Adamson Mfg. Co. also manufactures Belt Conveyors, Bucket Elevators, Redler Conveyor-Elevators, Feeders, Screens, Crushers, Power Shovels, Speed Reducers, Car Pullers, Hoists and Winches, Belt Conveyor Carriers, and SealMaster Ball Bearing Units, all built to give long, useful service at the lowest possible cost.

EXPORT DIVISION
STEPHENS-ADAMSON MFG. CO.
127 Ridgeway Ave., Aurora, Ill., U. S. A.

Ceramic-Tipped Tools Machine Steel Parts

Ceramic-tipped cutting tools, while not new, have been limited in use to machining of plastics and easily machinable metals or alloys. During World War II, experimental work in England involved machining ferrous metals but little came of it production-wise. From Russia now comes news of further development.

The material—sintered corundum with a cobalt binder—is highly resistant to heat and is both hard and abundant. Ceramic tips are largely used for semifinish and finish machining of steel and iron, with efforts being made to apply them to roughing cuts.

As ceramic cutting edges are extremely brittle, they should not be used to machine the hard "skin" from cast iron or to scale the top layer of steel products. Also, they need a rigid system with no vibration.

Ceramic tips are ground with green carbide wheels with ceramic bond, 46 to 80 grit, and I to J hardness. Lapping is done on a cast-iron disk with a boron carbide paste.

A typical job is turning of grooved steel cylinders. Results: feed, 0.015 to 0.030 in. per rev.; speed, 350 to 450 ft. per min.; depth of cut, 0.030 to 0.080 in.; time between grinds, 18 min.—Am Mach, Nov 22, p113

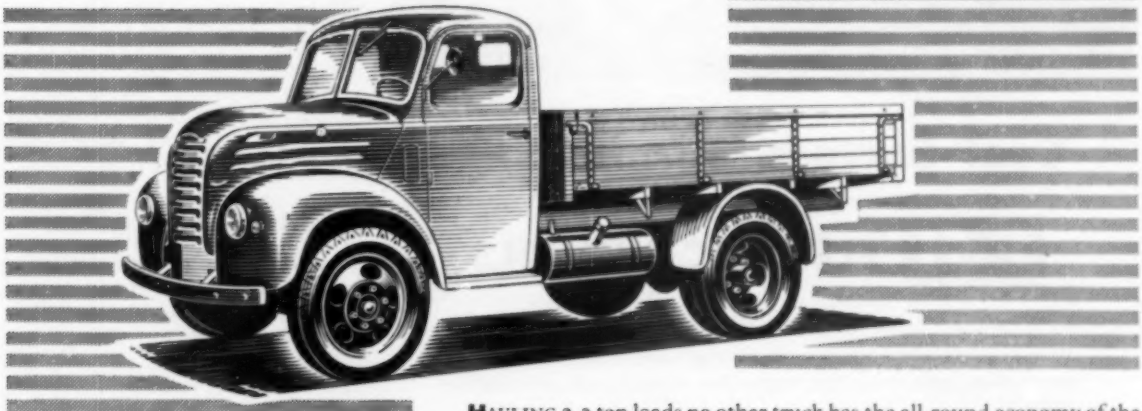
Chemical Developments

▶ **Industrial Detergent**—Planisol emulsifies all fats and oils and can be used for many jobs—from cleaning oil vessels to sanitizing food processing equipment. It is nontoxic, nonflammable, and has excellent bactericidal properties. Girdler Co. (Louisville, Ky.) makes it.—p146

▶ **Glass-Cloth Coating**—Silastic 132 silicone rubber coating for glass cloth, made by Dow Corning Corp. (Midland, Mich.), retains its dielectric strength, has good crease resistance. Coated cloth, tested with ¼-in. electrodes, has dielectric strength of 1,100 volts per mil both as is and after 21 days at a temperature of 250° C.—Chem Eng, Dec, p148

Mr. Transport Chief—

YOUR LOW CONTRACT TENDERS PAY BETTER THIS WAY



HAULING 2-3 ton loads no other truck has the all-round economy of the Thames 4-Cylinder 'Cost-Cutter'. Its outstanding saving guarantees a bigger profit even on your contract-clinching low bids. For this truck has *exactly the right power for the job*. It has too the precision-built design to keep it *on* the job longer with less maintenance.

- *Strong, wide and flat chassis for extra stability and easy body-building.*
- *Girling Hydraulic, two leading shoe brakes.*
- *Outstandingly strong gear box and clutch.*
- *Semi-forward control; 12-volt electrical system.*
- *Test it for yourself—your local Ford Dealer will gladly arrange a trial.*

Ask your dealer for details of the full range of famous Thames Commercial Vehicles. You have a choice of engines — the Dagenham built 4-cyl. Diesel, the 'Cost-Cutter' petrol engine, the 85 b.h.p. V.8 engine, or the P.6 Diesel.

4-CYLINDER 'COST-CUTTER'

THAMES

2 & 3 TON MODELS

SAVE MONEY BY THE MILE WITH THE RIGHT ENGINE FOR THE LOAD

FORD PRODUCTS · MADE IN ENGLAND

Cost Cutters, Jumbo Size

P&H ELECTRIC SHOVELS

Watch a big P&H Electric Shovel at work and you will see production unmatched by any other machine of comparable capacity.

Magnetorque* Hoist Drive is the reason. This *modern* power drive delivers as much as 35% more power to the dipper, providing more fully loaded dippers and faster cycles. Result . . . *more* production at *lower* cost!

Magnetorque has an inner and outer rotating member. As electric current from the operator's controller is applied to the windings in the spinning outer member — *torque* is transmitted electro-magnetically to the inner member, completing a positive yet resilient connection between the two.

There's no metal to metal contact this way. No friction. Hence, no wear. Magnetorque is simpler, does away with the usual DC generators, motors and complex control of adjustable voltage systems.

P&H Electric Shovels range from 4 to 10 cubic yards capacity. Other P&H Power Shovels, gasoline and diesel, from 11 cubic feet capacity. Also P&H Truck Cranes from 7 through 35 tons lifting capacity. Literature given on request.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

HARNISCHFEGER INTERNATIONAL CORPORATION • Cable "Harnisco" Milwaukee 46, Wis., U.S.A.

the P&H *Line*

New Machine Speeds Large-Bore Tunneling

Pushbutton tunneling for large bores is getting its first trial at Oahe Dam near Pierre, S. D. The tunneling machine was developed by Mittry Constructors (Los Angeles). It is designed to drill from 4 to 10 ft. per hr. The tunnels are being cut through soft rock.

Key part of the machine is the cutter head. It shoves against the tunnel face to claw and wedge rock loose. A center disk carries three sets of cutters and rollers placed radially 120° apart. Six sets of cutters and rollers project beyond the disk to full bore radius.

The inner disk and outer arms revolve in opposite directions to cancel torque. The outer arms also gather muck. Behind the cutters, buckets pick up and dump the excavated rock as the head moves. A combination of cutting and wedging breaks the rock. A 200-hp. electric motor supplies power. Hydraulic jacks push th[illegible]g ahead.—Eng News-Rec, Dec 2, p24

Coating Protects Steel

A new silicate coating similar to porcelain enamel for the protection of iron and steel products has been developed by Youngstown Sheet & Tube Co. and Poor & Co. The coating, to be called Porcenell, results from a 9-yr. search for a corrosion-resistant material that would make iron and steel competitive in the light-metals market where resistance to rust is important.

Porcenell is said to have these characteristics:

- It fuses to metal at a temperature of 900° to 1200° F., thus can be used on ferrous products without danger of metal distortion.
- An object, including edges and corners, can be completely coated to seal all metal surfaces against rust.
- Chemical stability and dielectric qualities are good. The coating resists chipping, scratching, and abrasion.

Basic ingredient of the coating is a sand found only in northern Michigan. It will be smelted in three Poor & Co. plants.—Business Wk, Oct 30, p92

...a better worker in a smaller frame

WESTINGHOUSE is now producing the new Life-Line "A" motor in sizes up to 10 horsepower—30 horsepower by 1956. This smaller, more compact motor is the best worker our engineers ever designed in terms of performance and durability.

We can't claim entire credit, however. The new Life-Line "A" was actually designed by thousands of motor users like yourself whom we checked to determine the characteristics most desired in their "ideal" motor.

These features are now a vital part of the Westinghouse Life-Line "A." A new armorized housing provides greater protection from foreign elements and physical abuse—is *completely* drip-proof regardless of mounting position. A new fortified insulation system offers higher thermal stability and greater resistance to moisture, oils and chemicals. Four-way seal, prelubricated bearings eliminate all cost of men and material necessary to grease conventional motors.

Write to me today on your company letterhead for your free copy of a 24-page booklet, BW-6154-A, containing complete information on this new Westinghouse Life-Line "A."

W. F. Gehle

W. F. Gehle, *Manager*
Industrial Equipment Dept.

YOU CAN BE SURE
...IF IT'S

Westinghouse

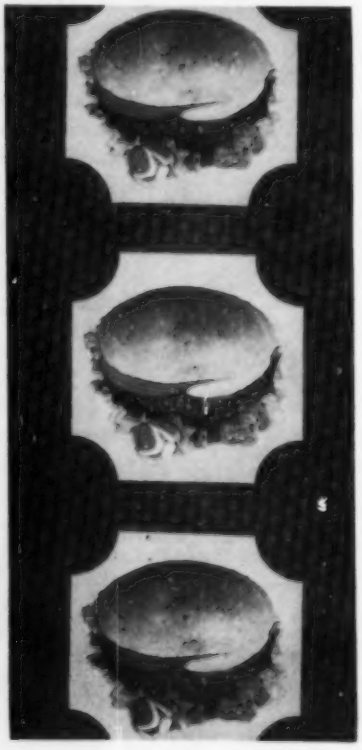
WESTINGHOUSE ELECTRIC INTERNATIONAL COMPANY
40 Wall Street • New York 5, U.S.A.

SELF-SELECTION selling places new demands on today's baked-goods packages. Standardization of sizes to insure adequate display is still a problem.

APPETITE APPEAL is emphasized in realistic pictures (above and below).

COOKIE BUCKET has strong child appeal. Seven colors assure attention.

SIX-COLOR PRINTING on these cookie-carton wraps stimulate sales.



Packaging to Sell

IN FEW FIELDS other than baked goods has packaging made such great strides. The bakery industry has shown the entire packaging world how most effectively to use new developments. No field of packaging—not even canning—has done more to emancipate the housewife from the slavery of the kitchen. Shown here are some of the industry's style-setting packages.—Mod Packaging, Nov, p114

ROUND LOAVES, presliced, are automatically wrapped in cellophane.

FOIL OVERWRAP provides long shelf-life and appeal for cookies.

CONVENIENCE is selling factor in multipurpose foil-lined tray.

NEW! Rapistan
MAGNETIC
POWER BELT CONVEYORS

These Rapistan Magnetic Power Conveyors fit into crowded areas between presses . . . provide fast, safe, efficient handling of metal pieces. These portable conveyors can be rolled from job to job . . . positioned at inclines up to 72°, for dropping parts into bins. Powerful magnets grip and carry everything from small nails to stampings wider than the belt itself. Rapistan Magnetic Conveyors are ruggedly built, for a lifetime of dependable service. They're exceptionally easy to operate . . . require almost no maintenance.

In most cases, your distributor has Rapistan Magnetic Conveyors in stock, ready for immediate delivery.

ILLUSTRATED LITERATURE: Send for 16-page catalog on Rapistan's complete line of conveyors and material flow systems.

Representatives in Principal Cities Throughout the World

Rapistan
Better Conveying Equipment
The RAPIDS-STANDARD CO., Inc.
432 Rapistan Bldg., Grand Rapids, Mich., U. S. A.

CONVEYORS
CASTERS
WHEEL-EZY TRUCKS

The Celestial Sphere—encircling a typical Waukesha Engine—symbolizes the world-wide locations of Waukesha key sales centers where service after purchase is the rule. Waukesha distributors carry stocks of replacement parts; your equipment is not idle waiting for a shipment from the home plant.

WAUKESHA ENGINES

The Waukesha line offers models in the range of 10 to 570 hp—bare engines or power units—designed to meet special requirements in overseas territories: altitude problems, available fuels, parts replacements. There are 14 Waukesha Diesels, 45 to 570 hp; 17 engines burning gasoline or gas, ranging from 18 to 280 hp; gas burning engines 325, 432 and 515 hp. Selective features include Aluminum Pistons, Counterbalanced Crankshafts, Cast Iron Pistons, Turbocharged Diesels and Vibration Dampers. The engine shown in the Sphere is a new Supercharged Waukesha Diesel, Model 135-DKBS, maximum horsepower 185 at 2800 RPM.

Address the Export Department requesting descriptive bulletins and the names of distributors ready to serve you.

WAUKESHA MOTOR CO.
VAUKESHA, WIS. U. S. A.

Extrusion Technique For Polyethylene Containers

Collapsible polyethylene tubes are in broad commercial production. Products packaged in the new tubes range from paste and glues to cosmetics and foods.

Bradley Container Corp. (Maynard, Mass.) forms the tubes from cylindrical sleeves extruded over a mandrel. Thinner and more uniform walls can be made by extrusion than by molding. After extrusion, the sleeve is cut to length and a molded polyethylene head is attached to one end. Radiant heat applied to both head and body while they are held together fuses them into one solid, inseparable piece.

Tubes are filled through the open bottom. Because of this, a variety of restricted neck openings can be used. The package contents may be dispensed one drop at a time, in spray form, or simply oozed out, depending on the type of opening.

To seal the tubes, the bottom edges of the cylindrical body are first heated and then crimped tightly together by cooled metal jaws.—Mod Plastics, Dec, p94

Flame-Stabilized Burner

Among the developments announced at the American Welding Society's annual meeting was the flame-stabilized burner. Air Reduction Sales Co. has experimentally tested it for flame-cleaning, flame-hardening, flame-cutting, glass working, and tube welding in a tube mill.

The burner has the main flame surrounded with a ring of pilot flames burning propane. The propane flames protect the main flame from the air, add an ignition source, and provide partial products of combustion, which increase the burning velocity of the main flame.

A conventional oxyacetylene tip operates at a maximum of 15 lb. per sq. in. (limit for acetylene pressure). The flame-stabilized burner operates at ten times the pressure of the conventional tip and releases four times the Btu. output. The new burner is regarded as the first major change in the cutting torch since its invention.—Weld Eng, Dec, p17

Britain invites the world to the new BIF

1955

The BIF — the world's greatest national trade fair — has a new look this year. With the entire London section now under one roof, at Olympia, it will be brighter, busier, more challenging than ever. At London and Birmingham all that's best in British industry will be on show.

Apart from its trade opportunities, you'll enjoy your visit to the BIF. Late Spring is a delightful season in Britain, and both London and Birmingham are ideal centres for touring the English countryside.

See the best in the world,
with the rest of the world at the

BRITISH INDUSTRIES FAIR

MAY 2–13 · LONDON · BIRMINGHAM

Information is obtainable from the nearest British Embassy, Legation, Consulate or United Kingdom Trade Commissioner.

NEW PRODUCTS

New Bituminous Paver-Finisher Features Rubber Tires, Long Wheel Base, Speed

Most important feature of new bituminous paver-finisher is the use of rubber tires instead of metal crawler pads. Tires prevent spin, weaving, or side-slip in making turns and in other steering operations. Brakes are provided on each side of the rear wheels to aid in steering where turning in a short radius is required.

Rubber tires also dampen shock from the vibrating tampers and relieve strain on structural parts. It can be driven over new paving without damaging the surface.

Over-all length is 19 ft. 5 in. The long wheel base cuts the number of passes and can eliminate the extra grading and patching often necessary in resurfacing old roads.

Speed of paving was demonstrated when the machine paved the two-lane inbound Liberty Tube (Pittsburg, Pa.) during two nights. Work on the 6,000-ft. tube was finished in a total of about 14 hr. The machine operates in a speed range of 15 to 54 ft. per min.

Other features include dual hydraulic controls, extra-large 4-cu. yd. hopper, calibrated depth-control indicator, adjustable widths from 8 to 13 ft. An electrically started blower-type heater eliminates the danger connected with flaming oil-soaked rags. Adjustable front bumper rolls provide for various types and sizes of dump trucks. The machine will lay any kind of hot or cold asphaltic material from 0 to 10 in. deep.—**Blaw-Knox Co., Export Dept., Chrysler Bldg., 405 Lexington Ave., New York 17, N. Y.**

Magnetic-Flux Welder

Semiautomatic welder combines advantages of hand and automatic welding. Called the MF welder, it feeds bare wire through a hand-held hopper containing magnetic flux. The magnetic field set up by the welding current causes flux to cling to the wire. Thus, the electrode, fed continuously from a coil, reaches the arc with a flux covering. Flux does not cover the arc so the actual welding operation can be observed. When no welding is being done, flux is held in the hopper by tiny permanent magnets in the walls of the nozzle orifice.

The MF welder is connected to any conventional welding machine. It operates over a current range of 150 to 500 amp. Two models are available. One is a portable, pear-shaped machine weighing only 34 lb.; the other is a larger, cabinet model.—**American Brake Shoe Co., 230 Park Ave., New York 17, N. Y.**

Watt-Hour Meter

Among the improvements in Westinghouse's two types of watt-hour meters are: a considerable increase in overload capacity; meter insulation has been improved and both potential and series coils can withstand 15,000-volt impulses. The socket-type meter has a de-ion arrester to protect it against lightning and other surges, and the outer electrode is detachable for inspection or replacement.

Both full- and light-load adjustments can be made from the front of the meter with fingers or screwdriver.—**Westinghouse Electric International Corp., 40 Wall St., New York 5, N. Y.**

Roller Compacts Fills

Grid roller is announced for compacting earth fills and salvaging bituminous highways. It features high-speed rolling and high densities in fewer passes. When crushing pit-run material directly on subgrade, it builds a firm base by crushing and compacting at the same time.

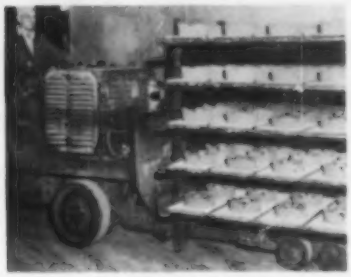
Cone-shaped core allows mounting of a cleaner blade on the frame. The blade removes wet material and can be adjusted to compensate for wear. Grid openings are 3½-in. square. Gross weight of roller is 30,000 lb.—**Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore.**

Electronic Leak Detector

A simplified mass spectrometer, known as type 24-110 Leak Detector, is capable of detecting one part of helium in 2-million parts of air. The new instrument is designed for line-testing operations, particularly those applications involving large vacuum systems where internal "out-gassing" requires auxiliary pumping, or for the detection of minute leaks that present a problem in television and other electronic tubes.—**Consolidated Engineering Corp., Pasadena, Calif.**

Vacuum Lifts Materials

Manufacturers, who would like to eliminate slings and hooks from their materials-handling operations, will be interested in the Vac-Lift. It can handle flat, non-porous materials, such as television tubes, sheet metal, plate glass, stampings, castings, formed parts. Complete unit consists of a Vac-Lift and an Air-Bloc hoist. Air that operates the hoist creates the vacuum. The load is also released by air. One-hand operation permits accurate spotting of the load. Operator releases load with finger-tip control.—**Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.**



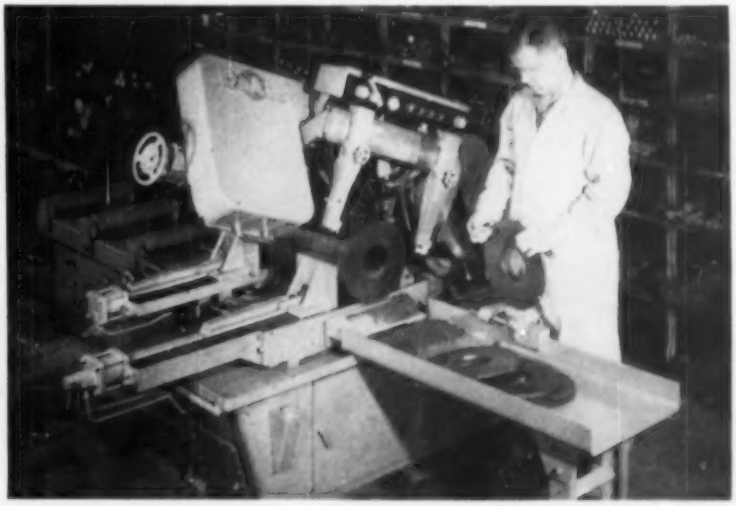
Lifts, Lowers at Slow Speed

New 10,000-lb.-capacity low-lift platform truck is equipped with a special slow-speed lifting jack that cushions the shock of raising and lowering.

Device minimizes breaking or cracking fragile loads during handling. Truck is shown lifting a rack of green foundry cores.—**Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.**

Small Vacuum Cleaner

The model QD-5 vacuum cleaner is only 22 in. high and 14 in. wide but has a dry capacity of ¼ bushel and a wet capacity of 2½ gal. The heavy-duty, rubber-mounted ¾-hp. motor delivers a minimum water lift of 67 in. Motor is equipped with a filter to eliminate radio reception interference and is housed with aluminum to prevent rust or corrosion.—**Clarke Sanding Machine Co., Muskegon, Mich.**



Continuous-Band Cut-off Saw

Power cut-off saw, first made by DoAll, is claimed to out-perform power hack saws by at least two to one. Major features include (1) a continuous band saw moving always in the cutting direction, (2) automatic feed pressure control to maintain blade pressure against work at value set by operator, (3) variable tool speed, (4) hydraulic band tensioning. Controls are mounted on a panel on the saw head. Automatic model (shown) has stock indexing table that feeds stock automatically for cutting blanks up to 24 in. long. Four basic models are made. All handle rounds to 12 in. in dia. and rectangular bars to 12x20 in. (or 12x12 in. on the automatic model). —DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill.

Pull-A-Way Weighs 9 lb.

A pull-a-way weighing less than 9 pounds and capable of pulling or lifting a ton and a half is now available. Engineering features are similar to larger industrial hoists—a double interlock that prevents the brake from slipping, an automatic notch-per-cycle letdown that assures positive control, and safety handle that prevents serious overloading. Single strand, its 14-ft. aircraft cable will accommodate a 1,500-lb. pull; double strand, 3,000 lb.

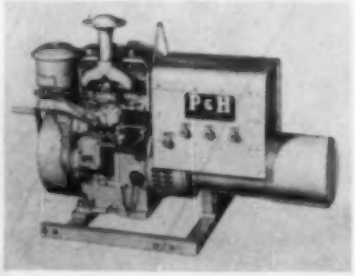
This new Type "R" Pull-A-Way is ideal for removing stumps, loading a boat, pulling a motor out for repair, or hauling a car out of a ditch or snow bank.—**American Chain & Cable Co. Inc., 230 Park Ave., New York 17, N. Y.**

Dryer Processes Feeds

Dehydrator, made by Heil Co. for Arnold, is suitable for processing alfalfa and cereal grasses, fodder corn, sorghum, soya bean forage, other feeds. Capacity is 2,000 lb. per hr. (dry) of chopped alfalfa containing 75% moisture. Evaporation rate is 6,000 lb. of water per hr. The dryer is recommended for farms and ranches with at least 100 acres of forage crops to reduce their feed costs and maintain maximum nutritive values.—**Arnold Dryer Co., Milwaukee 1, Wis.**

Acoustical Form Board

Designed to meet the increasing popularity of poured-in-place gypsum roof decks, a new form board is meant to perform four functions: to serve as an attractive, incombustible interior ceiling; as a permanent roof deck form; as an acoustical ceiling and roof insulating; or as thermal and acoustical insulation.—**Owens-Corning Fiberglas Corp., Toledo 1, Ohio.**



Gasoline Engine Welder

A new lightweight arc welder driven by a gasoline engine is now in mass production. The new welder was designed to combine compact size with maximum output.

Power is supplied by a two-cylinder, air-cooled gasoline engine close coupled to the P&H-built welding generator. Capacity is 20 to 200 amp., and weight of the new model is only 425 lb. Dimensions: 45 in. over-all, 20 in. high.—**Harnischfeger Corp., 4601 W. National Ave., Milwaukee 46, Wis.**

NEW PRODUCT BRIEFS

Tabulating-card File—Increased efficiency of machines and operators in all types of punched-card operations is possible through use of new tabulating-card file. Modern file houses 80,000 punched cards and includes push-up reference feature, positive locking of compression followers, easy tray stacking, and trays-in drawer principle.—**Remington Rand Inc., International Div., 315 Fourth Ave., New York 10, N. Y.**

Surface-finish Scales—Cylindrical surface roughness scales for curved surfaces consist of two 6-in.-wide, 2-in.-long scales. Use: to check surface finished on machined surfaces from 4 to 250 microinch values.—**International General Electric Co., 570 Lexington Ave., New York 22, N. Y.**

High-temperature Greases—New grease thickener, Estersil GT, makes greases resistant to high temperatures, rain, sleet, and snow. It consists of silica particles covered with special compound to provide waterproofing qualities. Several oil companies are trial-marketing greases made with this thickener.—**E. I. du Pont de Nemour & Co., Wilmington, Del.**

Ball-Bearing Trolleys—A new line of ball-bearing trolleys for overhead conveyors, known as series 500, has been developed for use on 3-, 4-, or 6- in. I-beams. Trolleys for the 3-in. beams have a rated load capacity of 300 lb. in monoplane installations; for 4-in. beams, a capacity of 600 lb.; and for 6-in. beams, a capacity of 1,200 lb.—**Link Belt Co., 2680 Woolworth Bldg., New York 7, N. Y.**

Remote Duct Evaporators—New 2-, 3- and 5-hp. evaporators have full capacity coils based on standard 400 cu. ft. of air per min. per ton. Units are equipped with flanged frame for ducts, drip pan and fittings, and adjustable expansion valve. Lightweight construction permits installation in either horizontal or vertical duct runs.—**Worthington Corp., Harrison, N. J.**

MANAGEMENT REPORT

First Machine Tool Show in 8 years will open in Chicago at the International Amphitheater on September 6, run through to the 17th, according to the National Machine Tool Builders' Association. Exhibits are confined to American-made machine tools; more than 150 companies now plan to show. Exhibit area is expected to reach over 400,000 sq. ft. of floor space. A Production Engineering Show will run concurrently at Chicago's Navy Pier to exhibit corollary equipment.

By price-tagging all production equipment, Clark Equipment Co.'s Industrial Truck Division found that it instilled more respect for its machines and tools into workers. The company attributes a reduction in tool-breakage expense of 20% and a substantial reduction in machine down-time for maintenance and repair, directly to this cost-reduction program.—Factory, Dec, p107

A few cents on an item may mean the difference between winning and losing a contract. And these few cents can be the cost of waste. This is why American Federation of Labor Local 1145 and the Minneapolis-Honeywell Regulator Co. have agreed to team up to fight waste.

The union decided it is the way to preserve the jobs of its members. The company prefers to cut waste rather than to cut employee wages to "keep competitive." The joint program to attack waste was explained to workers when some 6,000 employees met as guests of the company and union.

The program adopted jointly by labor and management urges workers:

- To be extra careful in their work so that defective parts are kept to a minimum.
- Not to loaf.
- To pick up all the tools they need the first time they go to the tool bin; not to make several trips.
- Not to get into discussions of events such as baseball games, persons, and places while working.

The union states that the proposed program is designed to protect members from unemployment. It was also stated that the union will not protect a deliberate loafer; neither will it protect a worker who limits production.—Am Business, Nov, p48

Tiny tape recorders apparently are going over well with businessmen who want to record conversations on the road. While there are smaller wire recorders, Mohawk Business Machines Corp. (Brooklyn, N. Y.) claims to make the smallest tape recorder—its size is $8\frac{1}{2}$x$1\frac{7}{8}$x$3\frac{7}{8}$ in. And it weighs a little over 3 lb.

Many traveling men naturally prefer a recording device—whether large or small—because they thus eliminate the drudgery of making out reports manually during the evening.

At Chicago, Ill. recently, 250 quality-control experts met to discuss the statistical-sampling method of controlling production errors. These were the key topics: (1) Why had it failed in many instances? (2) What should be done now to prepare quality control for still higher rates of production? (3) What do you do with top management that will not listen when the quality-control department proposes a change.

These were some of the answers: Failures could usually be traced back to one thing—too much emphasis on the statistics themselves and too little on what the statistics were supposed to do. Too many companies forgot the aim of their quality-control programs and allowed statisticians to decide where controls should be set up.

Management will have to work harder to produce maintenance-free equipment. Companies that are now turning to more and more automatic operations will demand it. These demands will force a change in attitude toward quality control throughout industry. If companies are to swing successfully into higher volumes of production, their quality-control departments will have to be more than just quality watchdogs. They will have to prevent defects from happening in the first place.

The experts agreed that a quality-control department that is to function properly must answer directly to top management, not anyone in production.—Business Wk, Dec 18, p156

Shop accidents increase in hot weather. So to find what effect temperature has on the accident rate, Allis-Chalmers Mfg. Co. studied the problem for a year. The study considered temperature, barometric pressure and humidity.

The results of the test and conclusions: (1) Accidents are *not* more frequent on hot summer days than on cool summer days. (2) It is unlikely that sunshine or overcast affect accident frequency. (3) Barometric pressure and humidity have little, if anything, to do with accident frequency. (4) In the summer, cases involving hand tools, eye injuries, and harmful exposure (sunburn) increase but not especially on hot days. Final conclusion: more research is needed.—Am Mach, Dec 20, p114

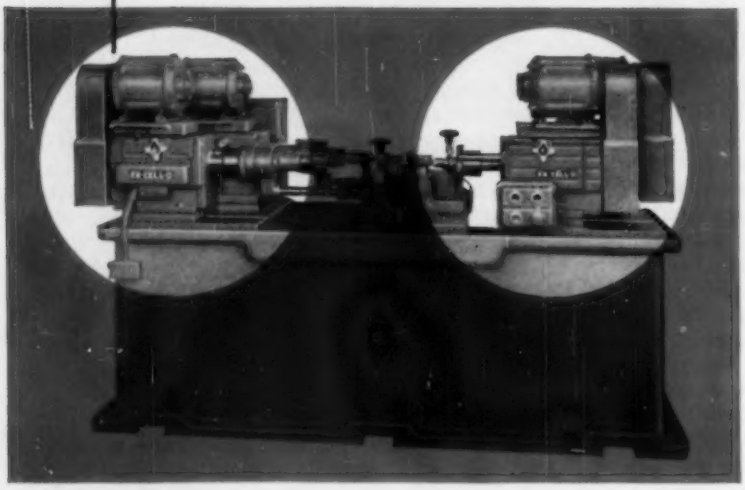
LOW COST

HIGH PRODUCTION

WITH

EX-CELL-O

UNITS



Four of Ex-Cell-O's famous quill-type Hydraulic Power Units drive the tools of the high-production machine shown above. This is one of many machines *built at very low cost* with Ex-Cell-O Power Units. All unit quills are advanced and can be retracted simultaneously from the central control station.

With one or more of these Ex-Cell-O Units, many kinds of modern automatic machines for drilling, reaming, counterboring, and spot-facing are now being built.

Write or cable Ex-Cell-O for Power Unit Bulletin, giving complete information about quill-type Hydraulic Power Units for LOW-COST, HIGH-PRODUCTION MACHINES.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN, U. S. A.

CABLE ADDRESS: XLO, DETROIT, U. S. A.

14-24

Unique Package Pours Plastic Splice On the Job

New plastic splicing material for electrical cable connections is mixed in its package at the point of use. Developed by Minnesota Mining & Mfg. Co., the splice is embedded in a liquid resin that later hardens into a hermetically sealed casting without applying heat.

Polyethylene-coated cellophane makes the package possible. Called "Unipak," it consists of a thin, rupturable envelope within a larger, non-rupturable envelope. Both are inside a third "safety" envelope, on which the label and instructions are printed. All components are heat sealed.

In use, the package is squeezed to break the inner membrane and bring resin and activator together. Kneading assures thorough mixing of the contents. A vinyl mold is placed around the prepared spliced and the mixed activator-resin is poured into the mold. The resin sets in 5 to 15 min. leaving a practically indestructible splice.—Mod Packaging, Nov, p122

Setup System Saves Time

Engineers at Glenn L. Martin Co. (Baltimore, Md.) have developed a three-point positioning system that permits machining jobs to be set up away from a machine on universal setup plates and then moved to the machine, ready to run within a few minutes. Or work can be transferred between machines without disturbing the setup.

A master plate with holes and perpendicular grooves is fixed permanently to each machine. Matching riser blocks, which accommodate jobs of varying heights, have buttons on their bases to locate them on the master plate and grooves to correspond to the grooves in the plate.

The work-holding fixtures and, on a profiling miller for example, the templet-holding fixtures have three buttons to locate them on the plate. Thus, when a machine is ready for a new job, the operator simply places preset fixtures on the master plate.—Am Mach, Dec 6, p142

NEW FREE CATALOGS

Rock-bolting Applications — An informative booklet (form 4155) on the subject of rock-bolting procedures and techniques describes the complete line of equipment manufactured for this application.—Ingersoll-Rand Co., Phillipsburg, N. J.

Machine Tools—Complete line of lathes, drill presses, shapers, and pedestal grinders are described and illustrated in catalog 5406.—South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind.

Nailing Machine — The Hydronic Nailer, especially adaptable to woodworking plants mass-producing boxes, skids, pallets, and other units that require high-speed output, is described and illustrated in bulletin N-454.—G. M. Diehl Machine Wks., Inc., Wabash, Ind.

Land-clearing Equipment—Bulletin 21 describes the new line of LeTourneau heavy-duty electrically powered and controlled equipment—specifically designed, engineered, and proved for large-scale land clearing.—R. G. LeTourneau Inc., 2411 South MacArthur, Longview, Texas.

Motor Controls—The new line of alternating-current motor control relays, contactors, and starters are described and illustrated in booklet CS-282.—Cutler-Hammer, Inc., 315 N. 12th Street, Milwaukee 1, Wis.

Industrial Radiography—Factors to be taken into consideration in planning and building a betatron industrial radiography laboratory are discussed in bulletin 31B8121.—Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Earthmoving Equipment — Catalog E-73-D contains technical data and descriptive material on complete line of earthmoving equipment.—International Harvester Export Co., 180 N. Michigan Ave., Chicago 1, Ill.

Heavy-duty Cranes—Heavy-duty Moto-Cranes and Self-Propelled Cranes in the "524" series are featured in catalog 25593-4.—The Thew Shovel Co., Lorain, Ohio.

Industrial Periscopes—Bulletin 301 covers construction of typical periscopes, also steps necessary in planning for an industrial periscope and data needed when ordering a periscope.—Kollmorgen Optical Corp., Northampton, Mass.

Titanium Tubing—Properties, applications, and advantages of titanium tubing are presented in bulletin 42.—Superior Tube Co., 1528 Germantown Ave., Norristown, Pa.

Machining with Stellite—Complete information about Deloro Stellite Grade 100 cutting tools is given in booklet, "Machining with Deloro Stellite."—Deloro Smelting Co. Ltd., Deloro, Ontario, Canada.

Process Timer—Bulletin GEC-1223 describes in detail the operation, advantages, and applications of the TSA-18 process timer.—International General Electric Co., 570 Lexington Ave., New York 22, N. Y.

Hydraulic Power Units—Quill-type hydraulic power units for use with high-production machines are covered in detail in bulletin 45828.—Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

Power-plant Equipment — Complete information is available on waterwheels, alternators, steam turbines, boilers, transformers, generators, and circuit breakers.—Hitachi Ltd., Overseas Div., New Marunouchi Bldg., Chiyoda-ku, Tokyo, Japan.

Gear-hobbing Machines—Complete information about precision gear-hobbing machines (Type RF), for cutting spur gears and helical gears, is given in bulletin No. 4020E.—Schiess-Aktiengesellschaft, Hansaallee 289, Dusseldorf-Overkassel, Germany.

Purification Equipment — Catalog, available in English, French, and Spanish, describes Honan-Crane oil-purification equipment and shows typical applications in power-plant operations.—Honan-Crane Corp., 26 Madison Ave., Lebanon, Ind.

Electrical Engineering—Booklet, entitled "The AEG High-Voltage Institute," describes the equipment and activities of the new Institute in Kassel, Germany.—Allgemeine Elektricitats-Gesellschaft, Export Dept., Frankfurt (Main), Germany.

Grinding Machine—Complete information about the Diversimatic No. 1-C centerless grinder is given in Form CDG 5101.—Van Norman Co., Springfield 7, Mass.

Piping and Pressure Vessels—Booklet, entitled "Taylor Forge," Vol. 1 No. 2, contains helpful information about problems dealing with piping and pressure-vessel work.—Taylor Forge & Pipe Works, P. O. Box 485, Chicago 90, Ill.

Impact Tools—Form 38 describes line of solenoid-operated impact tools, which are ideal for staking, riveting, marking, steel stamping, and many other jobs.—Black & Webster, Inc., 445 Watertown St., Newton 58, Mass.

Water Purification—The physical characteristics, types, and sizes of the new Dorrco Aldrich Perifilter water-treatment system, as well as its operation, applications, and advantages, are described in bulletin No. 9042.—Dorr-Oliver Inc., Stamford, Conn.

Microwave Equipment — Microwave communication equipment, which provides communication circuits suitable for telephone, teletype, telemetering, and video transmission, is described and illustrated in bulletin 2-54-5M-WP.—Collins Radio Co., Cedar Rapids, Iowa.

Sewage-plant Engines—A graphically illustrated bulletin (WP-1099-B3) on engines for sewage plants contains design information, comparison fuel analysis charts, selection information, and engine ratings. — Worthington Corp., Harrison, N. J.

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Trench-digging Equipment—Complete information on the model 190 Backfiller, a heavy-duty machine for use on pipe lines and similar heavy construction projects, is given in bulletin S-118.—Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland, 17, Ohio.

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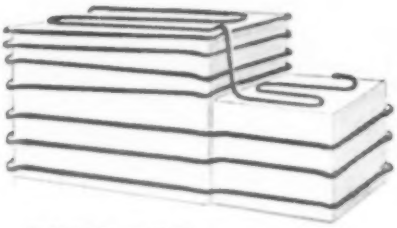

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